ROCKY MOUNTAIN ARSENAL

INSTALLATION RESTORATION PROGRAM

STATUS REVIEW

MAY 77

REPORT DOCUMENTATION PAGE

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13. ABSTRACT *(Maximum 200 words)*

THIS DOCUMENT REVIEWS DIFFERENT ASPECTS OF THE INSTALLATION RESTORATION PROGRAM. REVIEWED IS THE STATUS ON: (1) MANPOWER, (2) RESOURCES, (3) GEOHYDROLOGY, (4) PROCESS TECHNOLOGY, (5) ECOSYSTEMS, (6) MALD, (7) QUALITY CONTROL, AND (8) DATA MANAGEMENT.

14. SUBJECT TERMS

CONTAMINATION ANALYSIS

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RMA -- INSTALLATION RESTORATION PROGRAM STATUS REVIEW

MAY 77

AGENDA

0830 - 0840	Commander	Colonel Byrne
0840 - 0850	IR Manpower and Facilities	Mr. Glassman
0850 - 0905	Resources Status	Mr. Berry
0905 - 1000	Geohydrology Status	
	Interim Containment	Mr. Cook
	360° Monitoring	Doctor Arndt
	Boundary Investigations	Doctor Arndt
	USGS Modeling	Doctor Arndt
	Comprehensive Survey	Doctor Timofeeff
1000 - 1015	BREAK	
1015 - 1045	Process Technology	Mr. Loven
1045 - 1105	Ecosystems Activity	Mr. McBride
1105 - 1120	MALD Activity	Doctor Grabbe
1120 - 1130	Quality Control	Mr. Welling
1130 - 1145	Data Management	Mr. Krimmer
1145 -	Commander	Colonel Byrne

INSTALLATION RESTORATION PROGRAM

SUMMARY MANPOWER STATUS

FY 77

	APR	MAY	JUN	JUL	AUG	SEP
JANUARY PLAN	59	59	61	61	61	61
APRIL PLAN	40	41	61	61	61	61

AS OF MAY, 20 POSITIONS ARE VACANT. THIRTEEN (13) EMPLOYEES HAVE BEEN IDENTIFIED FROM RIF AND 7 ARE RECRUITING ACTIONS.

RESOURCES STATUS

CURRENT IR FACILITIES

BUILDING	FUNCTIONS
BUILDING 612	DIRECTOR, PROGRAM MANAGEMENT, DATA MANAGEMENT
BUILDING 741	ECOLOGY, GEOHYDROLOGY
BUILDING 743	MALD
BUILDING 742/802	PROCESS TECHNOLOGY

STABILIZED BILLING AS OF 25 APR

TASK OMA	FUNDS REC THROUGH 3RD QTR	BILLED THROUGH APRIL	REVISED AFP CUMULATIVE
CONTAMINATION SAMPLING	94.0	43.6	174.0
CONTAMINATION ANALYSIS	478.0	323.7	821.0
ECOLOGY SURVEY	163.0	109.6	263.0
MIGRATION INVESTIGATIONS	82.0	60.0	125.0
DATA MANAGEMENT	155.0	105.0	255.0
PROJECT SUPPORT	404.0	312.8	504.0
TOTAL OMA	1,376.0	954.7	2,142.0
RDTE			
DECONTAMINATION TECHNOLOGY		187.8	730.0 *

* 280K ADDITIONAL RDTE FUNDS RECEIVED

RESOURCES ALLOCATED TO WES WORK STATEMENTS

	$ (000) FY 77 OMA
INTERIM CONTAINMENT	$30
SOILS LAB, PROC & TNG	30
COMPUTER PROGRAMS	5
SOILS TESTING, MINERALOGY	5
	$70

	$ (000) FY 77 RDTE
UV-OZONE STUDIES	$140
BASIN F STUDY	55
	$195

INCURRED COSTS AS OF 25 APR

OMA	PLAN	COST PLUS COMMITMENTS
CONTAMINATION SAMPLING	256.0	219.7
CONTAMINATION ANALYSIS	302.6	252.6
ECOLOGY SURVEY	135.8	116.4
MIGRATION INVESTIGATIONS	107.4	103.1
DATA MANAGEMENT	85.1	74.4
PROJECT SUPPORT	262.8	258.6
TOTAL OMA	1,149.7	1,024.8
RDTE		
DECONTAMINATION TECHNOLOGY	163.6	146.5

GEOHYDROLOGY

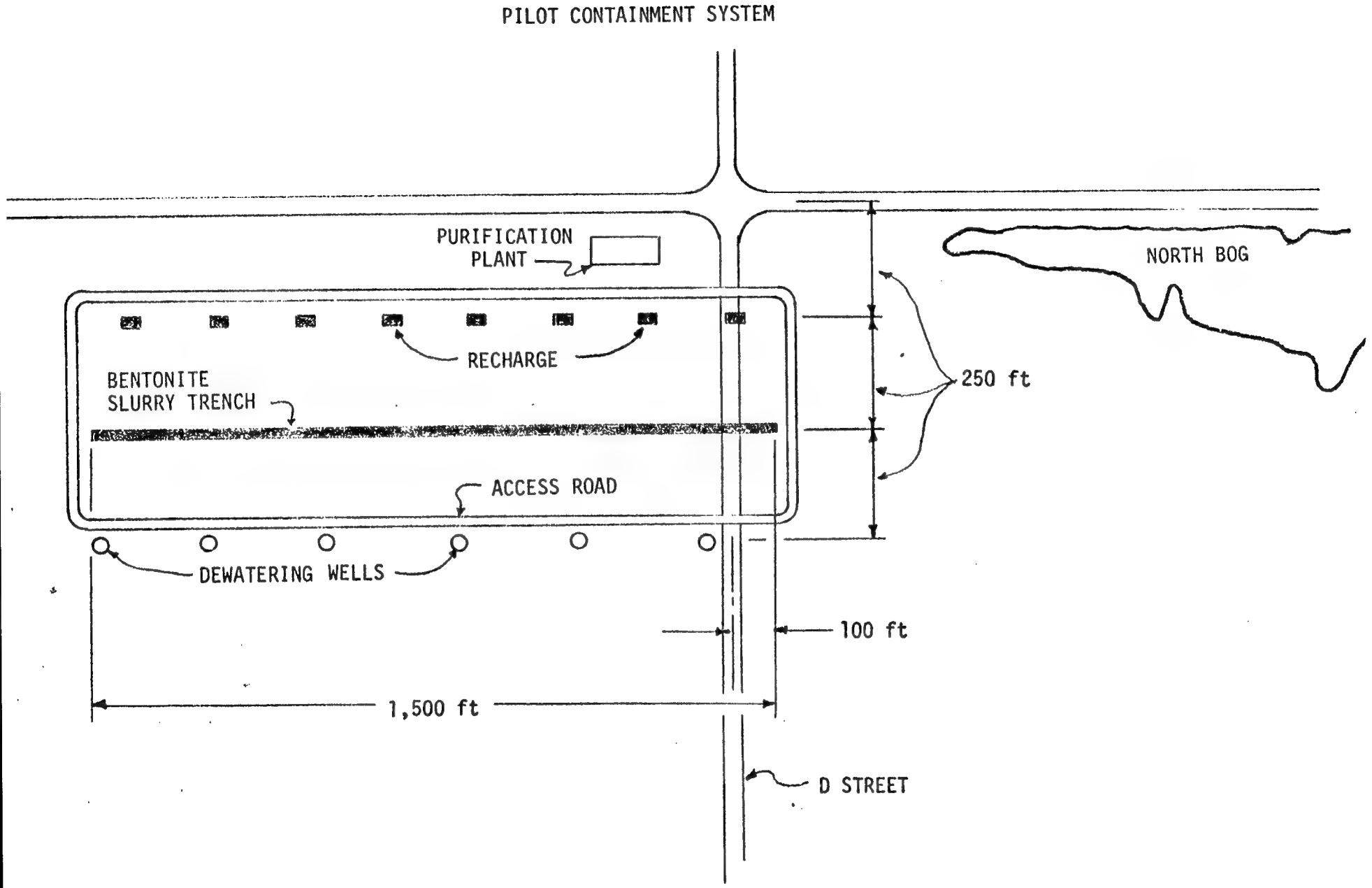
PILOT CONTAINMENT SYSTEM STATUS

1. Introduction

a. The pilot containment system is being installed as a first step in compliance with the State Cease and Desist Order of Apr 75 to prevent the flow of contaminated groundwater past the north boundary of the Arsenal. Investigations and studies have been conducted to determine the most effective system which would meet the Cease and Desist Order requirements.

b. A physical barrier from ground level through to the bedrock constructed of a bentonite slurry mix has been chosen as the most suitable system consistent with the soil stratigraphy and groundwater flow at the north boundary. Associated with the barrier is a dewatering system located upstream for the removal of the contaminated water, a water-treatment facility to decontaminate, and a recharge system located downstream of the barrier to reintroduce the processed water back into the aquifer.

c. The (first) chart shows the location at the north boundary and the relative configuration of the pilot containment system. The 1,500 foot long bentonite barrier has been positioned to intercept the major DIMP plume migrating across the north boundary. The barrier itself is located 500 feet south of the Arsenal boundary line, the dewater line 250 feet upstream of the barrier, and the recharge line 250 feet downstream of the barrier. The water-processing facility is presently being considered for installation north of the recharge line to permit gravity flow to recharge


PILOT CONTAINMENT SYSTEM
PURIFICATION PLANT
NORTH BOG
RECHARGE
BENTONITE SLURRY TRENCH
250 ft
ACCESS ROAD
DEWATERING WELLS
100 ft
1,500 ft
D STREET

line and minimize the expense of routing electrical power to the facility. The total project is being coordinated in-house between the Geohydrology, Process Technology Divisions of the IR Directorate and the Civil Engineering Branch of the DOF. WES is providing technical assistance and USGS is providing modeling support to help determine the required capacity of the dewatering water processing, and recharge systems. Overall coordination with the PMO is maintained on a continuous basis.

2. EIS and 1391 Status

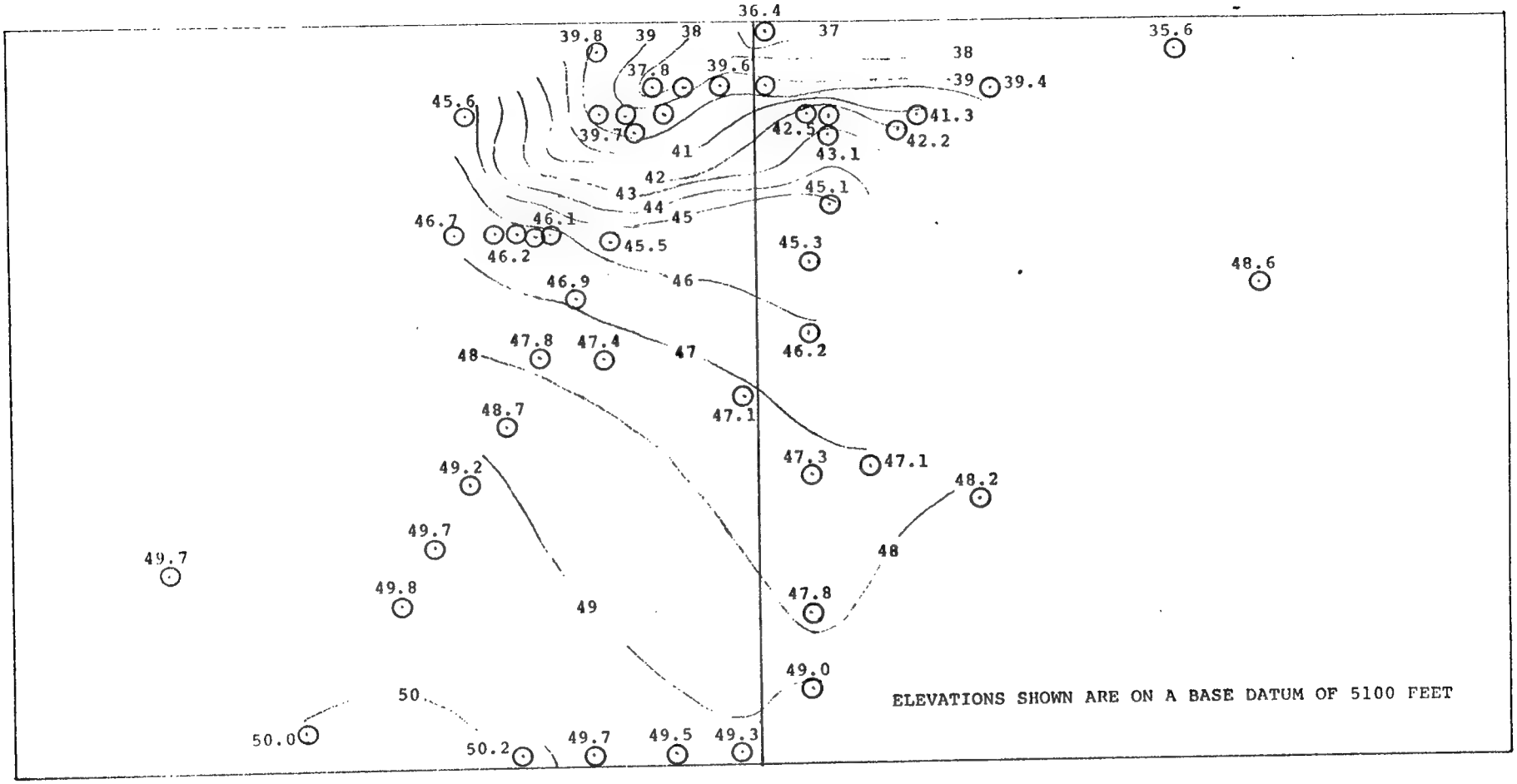
a. The 1391 requesting funding of the pilot containment system signed by the Commander, RMA, on 22 Feb and was forwarded to ARRCOM. Both the draft EIS and the 1391 were approved on 23 Feb. DARCOM approval was effected on 4 Mar. DARCOM approved the release of design funds associated with the 139i on 25 Apr. However, this action has been stopped and queries instituted by ARRCOM concerning the lease-hold acquisition of proposed well site off post. Correspondence with respect to this has been issued by ARRCOM to both DARCOM and RMA. RMA/PMO are looking into this matter at this very moment.

b. The draft EIS has been approved by DA and has been filed in the Federal Register by the Council for Environmental Quality. It is now being reviewed by interested agencies. Target for finalization is Aug 77.

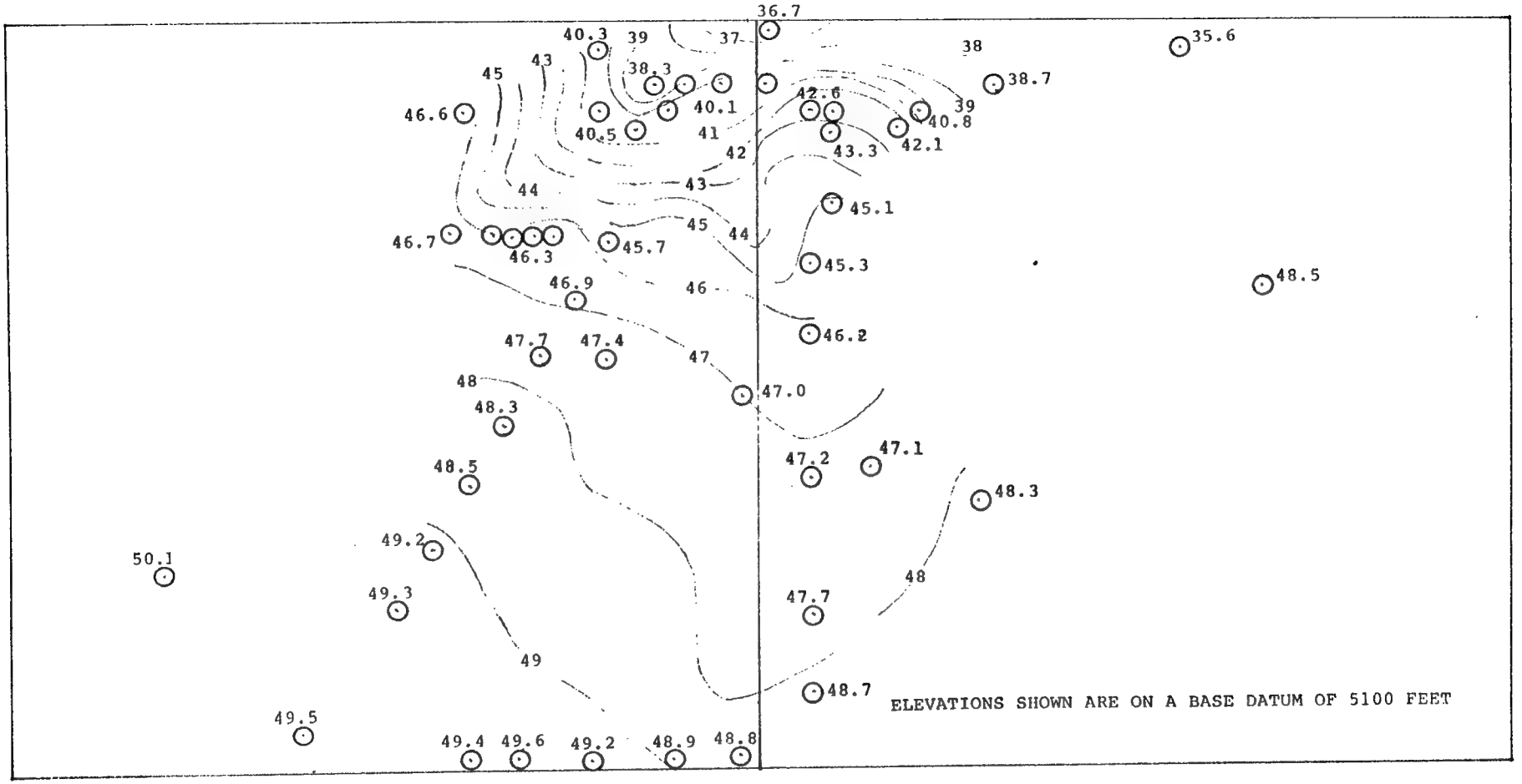
3. Preconstruction Testing and Evaluation

a. There are four areas of consideration in the preconstruction phase of the pilot containment system: (1) Simulation modeling; (2) Establishment of a monitoring network; (3) Slurry-mix testing; and (4) Recharge testing.

WATER TABLE ELEVATIONS AS OF 10 FEBRUARY 1977



WATER TABLE ELEVATIONS AS OF 2 MAY 1977



b. 360° Water-Quality Monitoring Program - The 360° water-quality monitoring program has been slightly revised so that the quarterly sampling schedule coincides with calendar quarters. The original sampling schedule which was begun 1 Nov 76 was based on a 16 week quarter rather than a 13 week calendar quarter. This change was submitted to, and approved by, both Shell Chemical Company and the Colorado State Department of Health. So that no sampling points would be missed, MALD temporarily received a large number of samples during the month of April so that all sampling points were measured during the Second Quarter (Jan - Apr 77). We are presently in the Third Quarter (Aug - Oct) sampling schedule.

c. Pilot Containment, Water-Level Monitoring

(1) Water-level measurements have been taken on all existing wells in Sections 23 and 24. The measurements were taken on a weekly basis until April and are now being evaluated on a monthly basis. When construction on the containment system begins, the frequency of measurements will be increased.

(2) No significant changes in water levels have been noted since measurements began in February. For the most part, water levels have generally declined since then and probably reflects the post spring run-off and recharge. The maximum change in any one well has been less than one foot.

(3) We are exploring the potential for the installation of continuous-recording monitor wells by the USGS with the Post Judge Advocate. These wells would be located both on and off Arsenal. The USGS will provide the equipment and manpower necessary to set up such a network. For the off-post wells, they would be totally responsible for all aspects related to such an installation. This approach is felt to be desirable, primarily because the baseline data for off-post water levels can be collected several months prior to the time the Army could do it under the terms of the Pilot Containment 1391.

(4) With respect to off-post monitoring of groundwater levels, the State Department of Health has agreed to monitor two sites. One site is well III on the Hall property and well 58 along the northwest boundary. This water-level monitoring will only be carried out in conjunction with the quarterly water-quality sampling schedule so the data derived from these wells is of marginal utility.

d. Pilot Containment, Water-Quality Monitoring - At present, 12 of the 60 wells in Sections 23 and 24 are being monitored for water quality as part of the 360° program. By the end of June, we will have sampled water from all existing wells in these two Sections to provide the baseline prior to operation of the pilot containment system. All wells in these two Sections will be sampled and analyzed at least twice prior to beginning of construction of the containment system.

e. Pilot Containment - Bentonite Evaluation - Water samples from wells 118, 127, and 133 were sent to Resource Management Products of Park Ridge, Illinois. This Company specializes in bentonite products, and they were asked to evaluate the compatability of RMA groundwater with various bentonites. Their report indicated that the total dissolved solids content of RMA groundwater was too high to use as the mixing water with standard bentonite. Their recommendation was to use a special contaminant-resistant bentonite and use potable water as the mixing agent. WES is also conducting laboratory bench tests on bentonite and water mixes. They are testing various bentonites with water from wells 60 and 121. Initially, testing performed by WES several months ago with water from well 60 indicated no deleterious effects to the sealing properties of the bentonite.

f. USGS Simulation Modeling Effort

(1) The report on the groundwater modeling in the vicinity of the containment system by the USGS has been delayed. However, we expect a letter report of essential findings this week. The final report is nearly complete and still has to go through the USGS review process, which generally takes several months.

(2) One of the major concerns with respect to the containment system was the effect on the groundwater system of temporary breakdowns of part of the system. The simulation model

assumed four pumping wells and four recharge wells as the dewatering and recharge components of the system. The model indicates that the 1,500 foot barrier as proposed will intercept 50 percent of the DIMP flowing past the north boundary. If the two exterior pumping wells were to break down, the efficiency of the barrier would be reduced to 46 percent in one week; 37 percent in one month; and in six months, the barrier would only intercept 25 percent of the DIMP. If the two interior dewatering wells were to break down, the efficiency in one week would be reduced to 48 percent, in one month to 42 percent, and finally to 25 percent in six months.

(3) These reduced efficiencies are worst case conditions because this assumes pumpage of the still oeprating wells was not increased. In any event, the margins of safety in the actual system will be higher because we are proposing six dewatering wells rather than four.

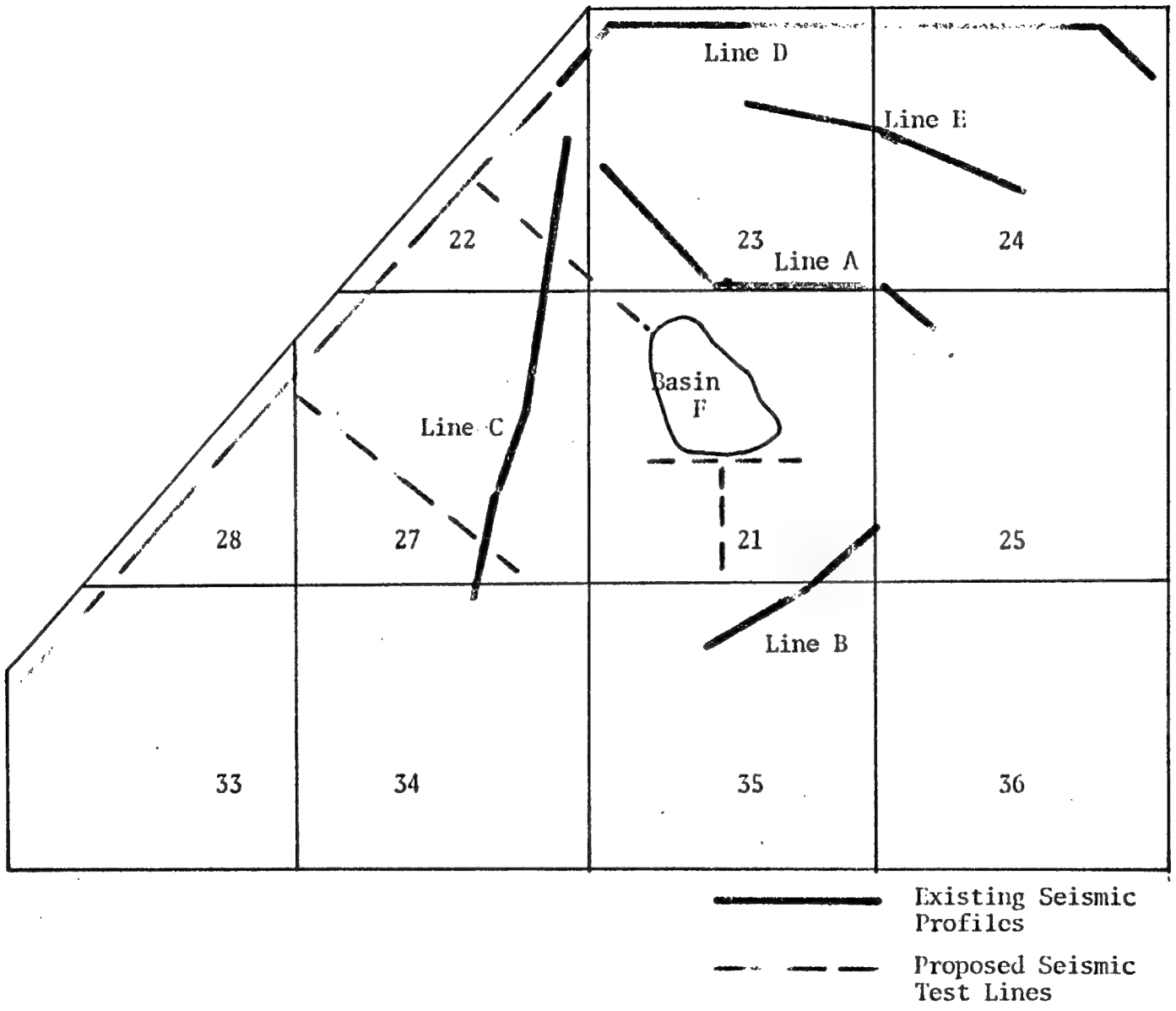
g. Northwest Boundary Studies (Irondale-DuPont Line)

(1) Subsurface investigations along the northwest diagonal have been extended southwest into Section 27. Limited availability of the drilling equipment and crew has restricted progress on this phase of operation of the Geohydrology Division.

(2) A contract has been let with Micro-Geophysics Corporation to perform seismic work in this part of the Arsenal. We are proposing to run several seismic profiles in the northwest quarter of the Arsenal. One line will be along the diagonal between Sections 22 and 33. The seismic line will necessarily overlap with existing test hole sites to provide ground-truth correlation. At least two seismic lines will be run southeast at right angles to the diagonal line toward Basin F. In addition, two short lines will be run south of Basin F in the vicinity of Basin C. Additional drilling will be needed along these lines to provide the subsurface correlation with the seismic profiles. This information should provide additional data to determine the bedrock conditions in that part of the Arsenal as well as provide greater insight into the setting of Basin F with respect to the hydrologic setting of that area.

h. Recharge Testing - One of the areas where very little reliable information is available is aquifer recharging. Literature searches and coordination with USGS and WES have both indicated that the only way to develop a recharge system capable of distributing the cleansed water uniformly back into the aquifer is through field evaluation.

(1) Two recharge test systems have been developed, the first being recharge bores; and the second a recharge trench. The recharge bore test was decided on initially in conjunction with

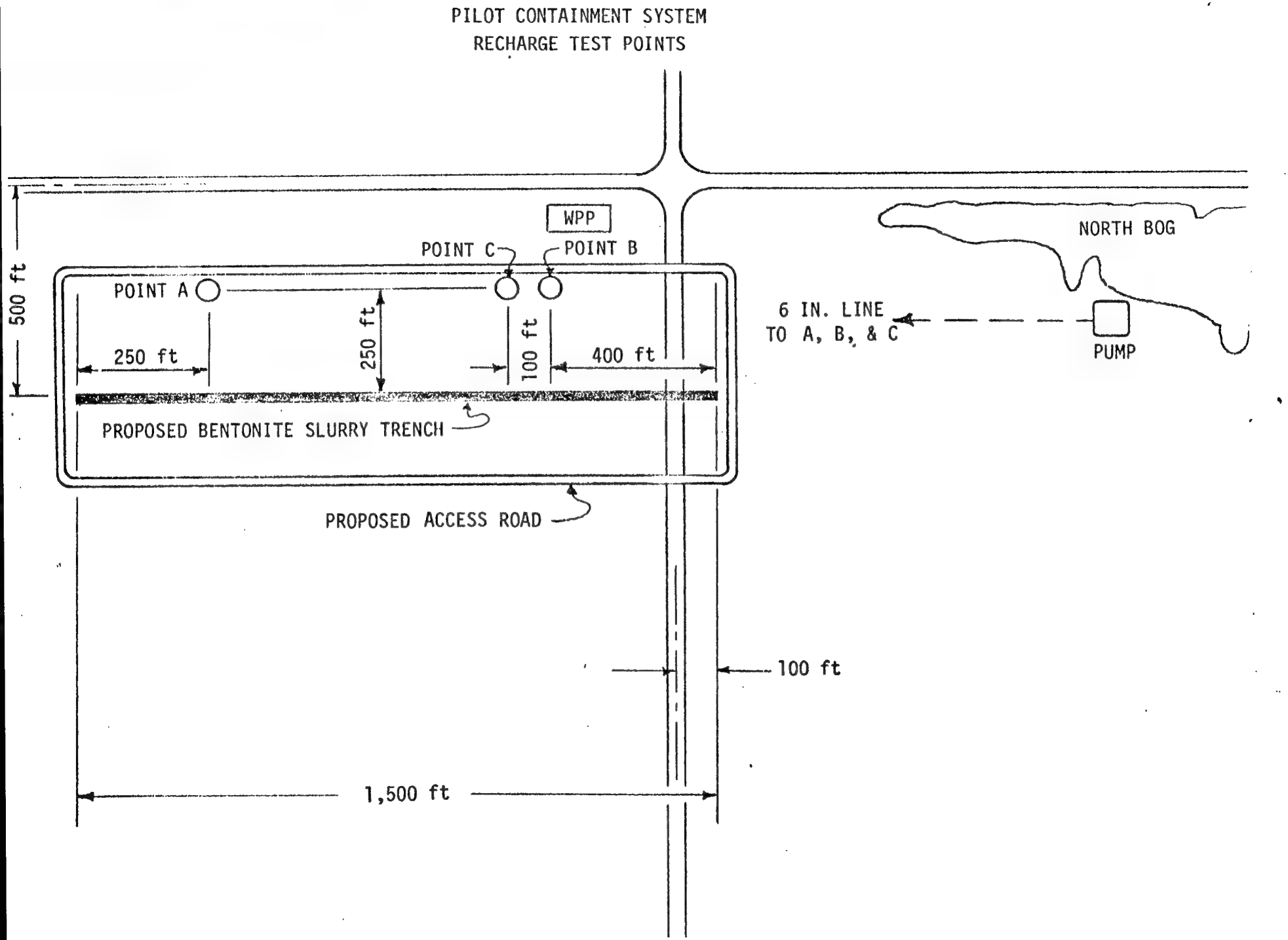


GEOPHYSICAL STUDIES AT ROCKY MOUNTAIN ARSENAL

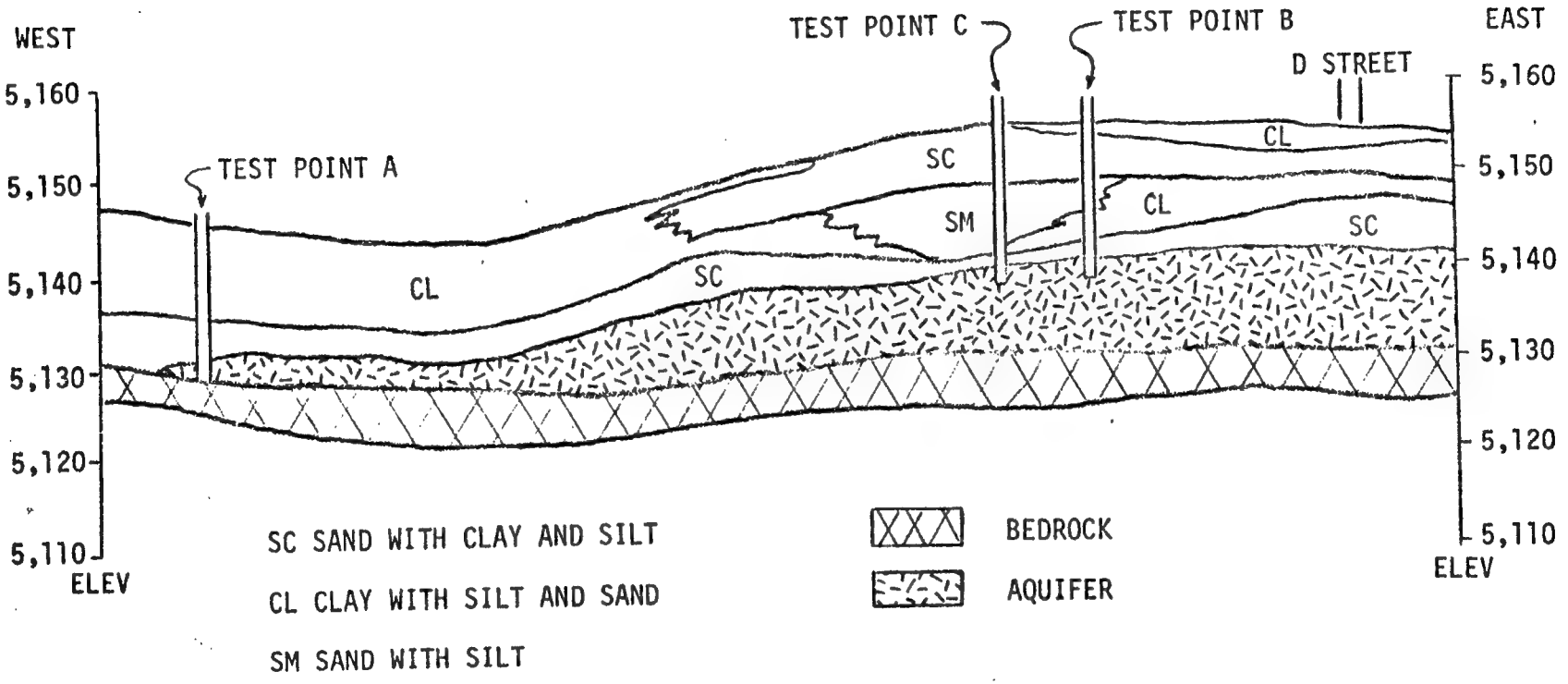
the PMO and WES as the method where the maximum information could be developed along the various positions on the recharge line where there was significant difference in the thickness of the underlying aquifer. The recharge test trench would then be constructed in one section of the aquifer aligned with the test bores. The information developed from the bore test and the trench test would permit the extrapolation of recharge trench design to other positions along the recharge alignment with varying thickness of aquifer.

(2) Chart 2 shows the position of the three test bores: A, B, and C. "A" is located 250 feet in from the west end of the proposed barrier; "B" and "C" are located 400 feet and 500 feet respectively in from the east end of the bentonite barrier; all three are located in the actual recharge line. In order to provide sufficient water for the test, approximately 2,300 feet of 6" irrigation line was installed from the bog to the west up to the "A" test bore.

(3) Chart 3 shows the three test bores in relationship to the cross sectional area of the soil and aquifer where the recharge system will be installed. The "A" bore is located in an area where the aquifer is approximately 1½' thick, and the distance from ground to bedrock is only 15½ feet. The static water table in this bore is approximately 4½ feet above the aquifer level and down 9½ feet from the top of the casing. .


PILOT CONTAINMENT SYSTEM
RECHARGE TEST POINTS
WPP
POINT C
POINT B
POINT A
NORTH BOG
6 IN. LINE
TO A, B, & C
PUMP
500 ft
250 ft
250 ft
100 ft
400 ft
PROPOSED BENTONITE SLURRY TRENCH
PROPOSED ACCESS ROAD
100 ft
1,500 ft

STRATIGRAPHIC CROSS SECTION
OF RECHARGE LINE
WITH TEST BORE LOCATIONS

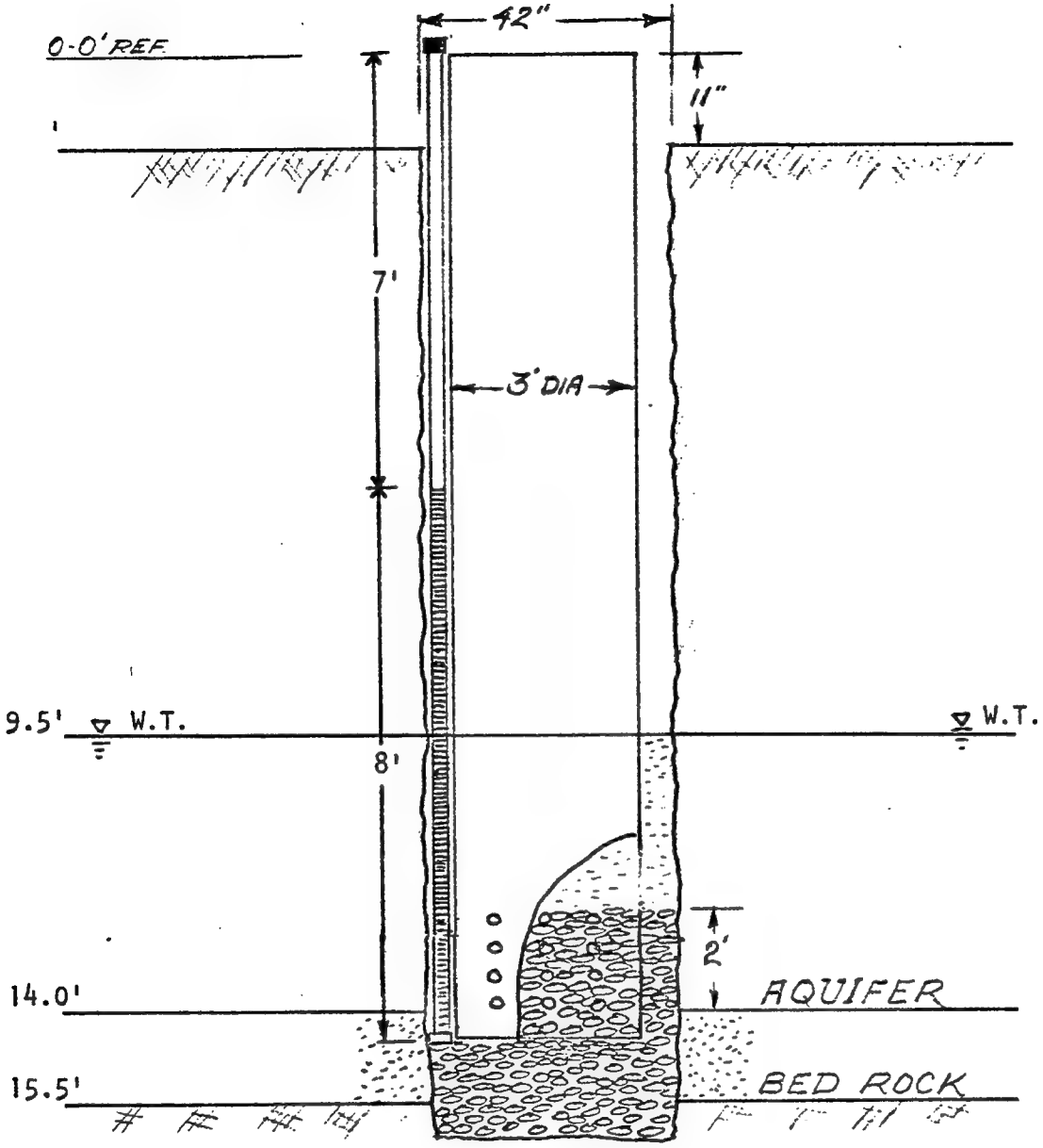


(4) Bores "B" and "C" are 100 feet apart and are located in areas where the aquifer is approximately 9 to 10 feet thick and the aquifer level is $\approx$ 15 feet from the ground surface. There was a slight rise of the water table above the aquifer height (½ foot) when the bores were installed. The purpose of putting two bores close together was to see if we could get repeatability and develop confidence in our testing techniques.

(5) The recharge test on the bores was to be conducted in two phases, Phase I, a slug test, where each bore would be filled with water to a level equal to the ground surface and infiltration measurements would be made as a function of time and height above the water table. Phase II would be a constant "Q" test. Each bore would be charged at specific flow rates (Q)= 10, 15, and 20 gpm for a period greater than 30 hours. The stabilized height above the water table would be recorded, as well as the total Q at each of the flow rates for each of the three bores. In addition, observation wells were installed at the periphery and 5 feet and 25 feet from the periphery of each bore to record the change in aquifer height at steady-state conditions (after 30 hours).

(6) The next three charts (4, 5, and 6) show a cross section of each of the three test bores, "A", "B", and "C". Each bore hole has a 3 foot diameter corrugated steel casing perforated at the bottom with 10 rows of 1" diameter holes, 4 holes per row. The top holes are approximately 14"

RECHARGE TEST BORE
LOCATION - A



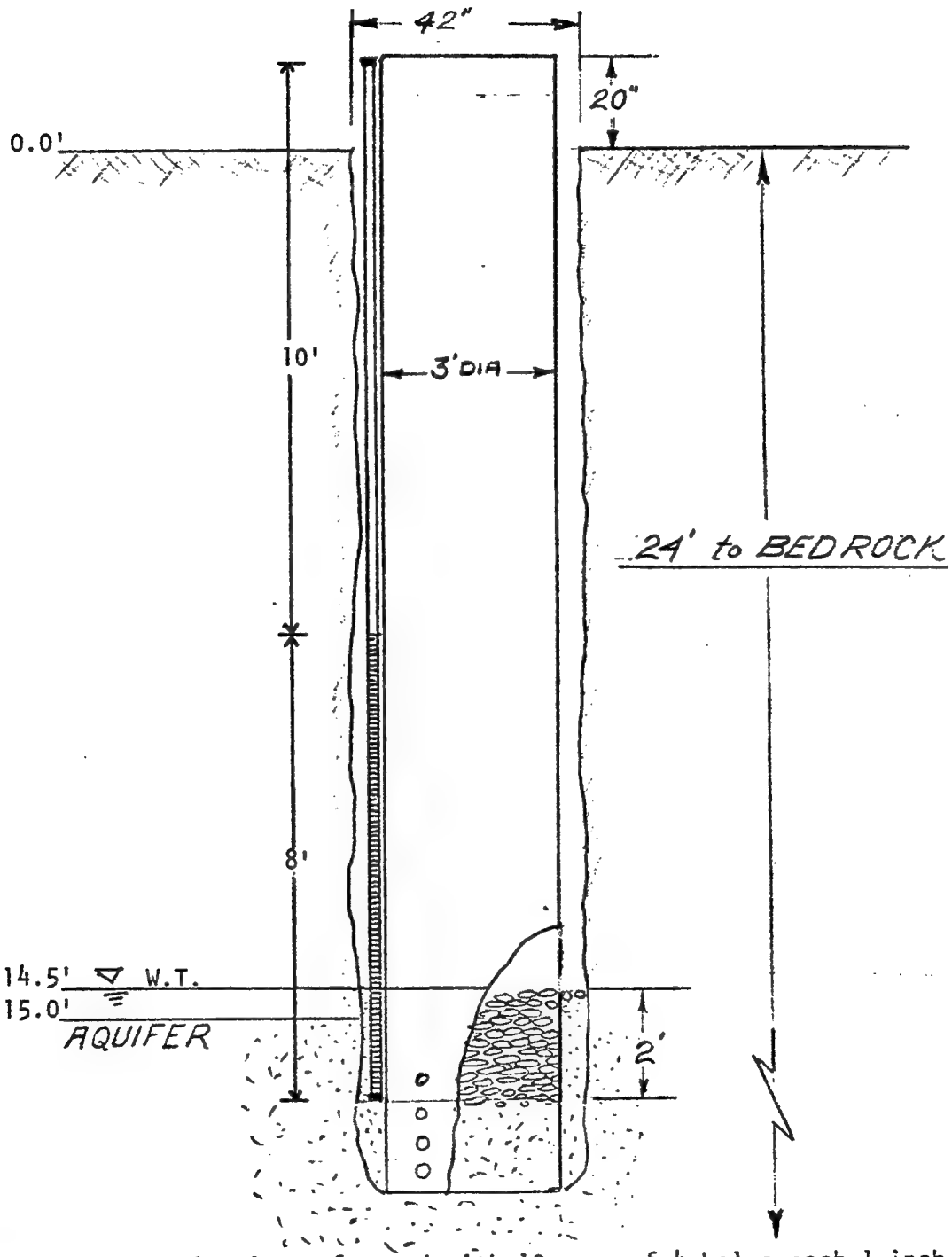
1 Bottom of 3 ft diameter casing is perforated with 10 rows of 4 holes each 1 inch in diameter.

2 A 2 inch PVC monitoring well with an 8 ft perforated section was set outside the 3 ft diameter casing on the down gradient side.

3 Two additional monitoring wells with 12 ft perforated sections were located 5' and 25' down gradient from the edge of the 3 ft diameter casing.

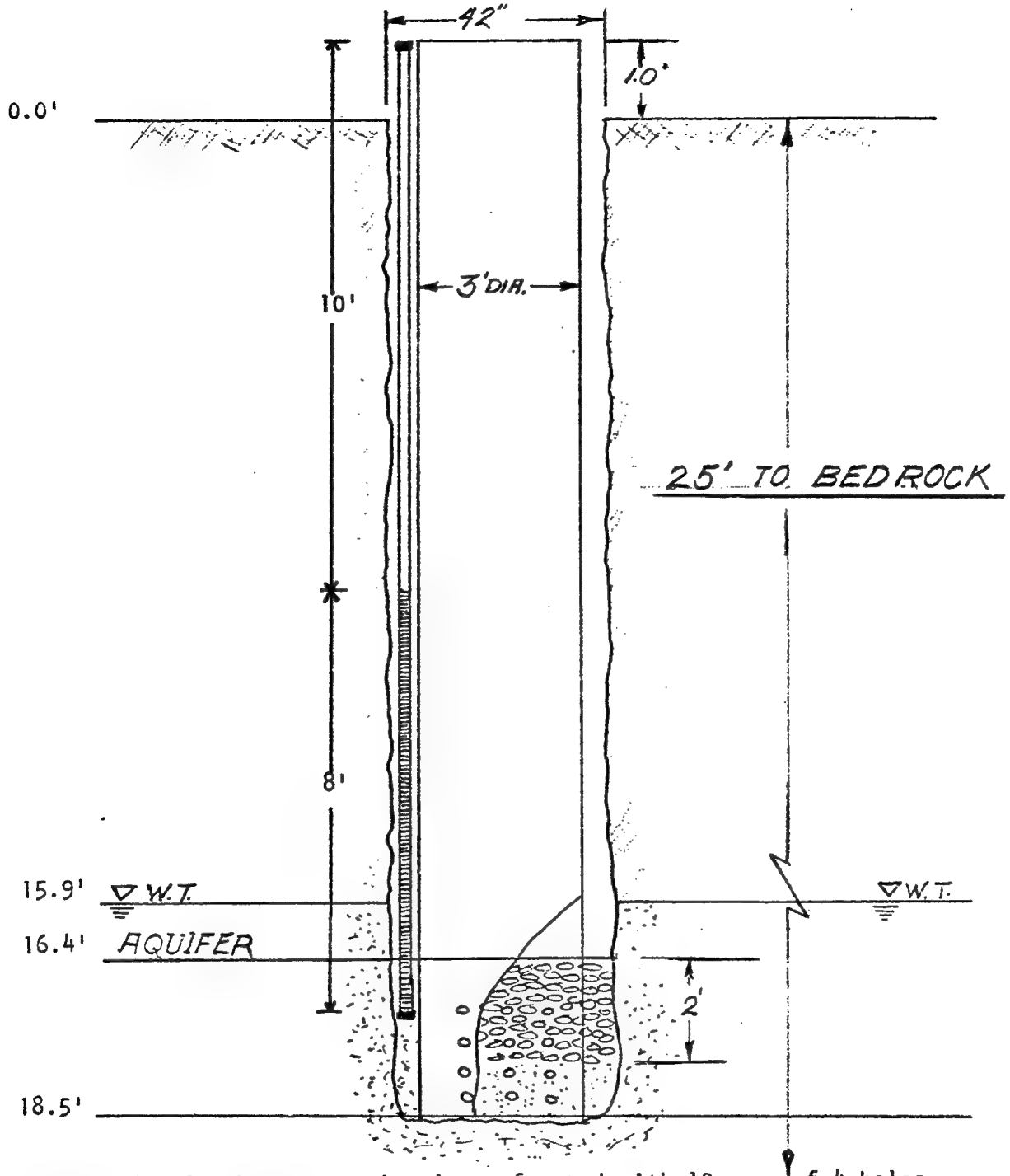
4 Bottom of bore, 6" below bedrock to 2' above aquifer filled with 3/8 to 3/4" washed gravel.

RECHARGE TEST BORE
LOCATION-B



- Bottom of 3 ft. Dia. casing is perforated with 10 rows of 4 holes each 1 inch in diameter.
- A 2 inch PVC monitoring well with an 8 ft perforated section was set outside the 3 ft diameter casing on the down gradient side.
- Two additional monitoring wells with 12 ft perforated sections were located 5' and 25' down gradient from the edge of the 3 ft diameter casing.
- 3/8 to 3/4" washed gravel, 2' thick down from water table

RECHARGE TEST BORE
LOCATION - C



1 Botton of 3 ft diameter casing is perforated with 10 rows of 4 holes each 1 inch in diameter.

2 A 2 inch PVC monitoring well with an 8ft perforated section was set outside the 3 ft diameter casing on the down gradient side.

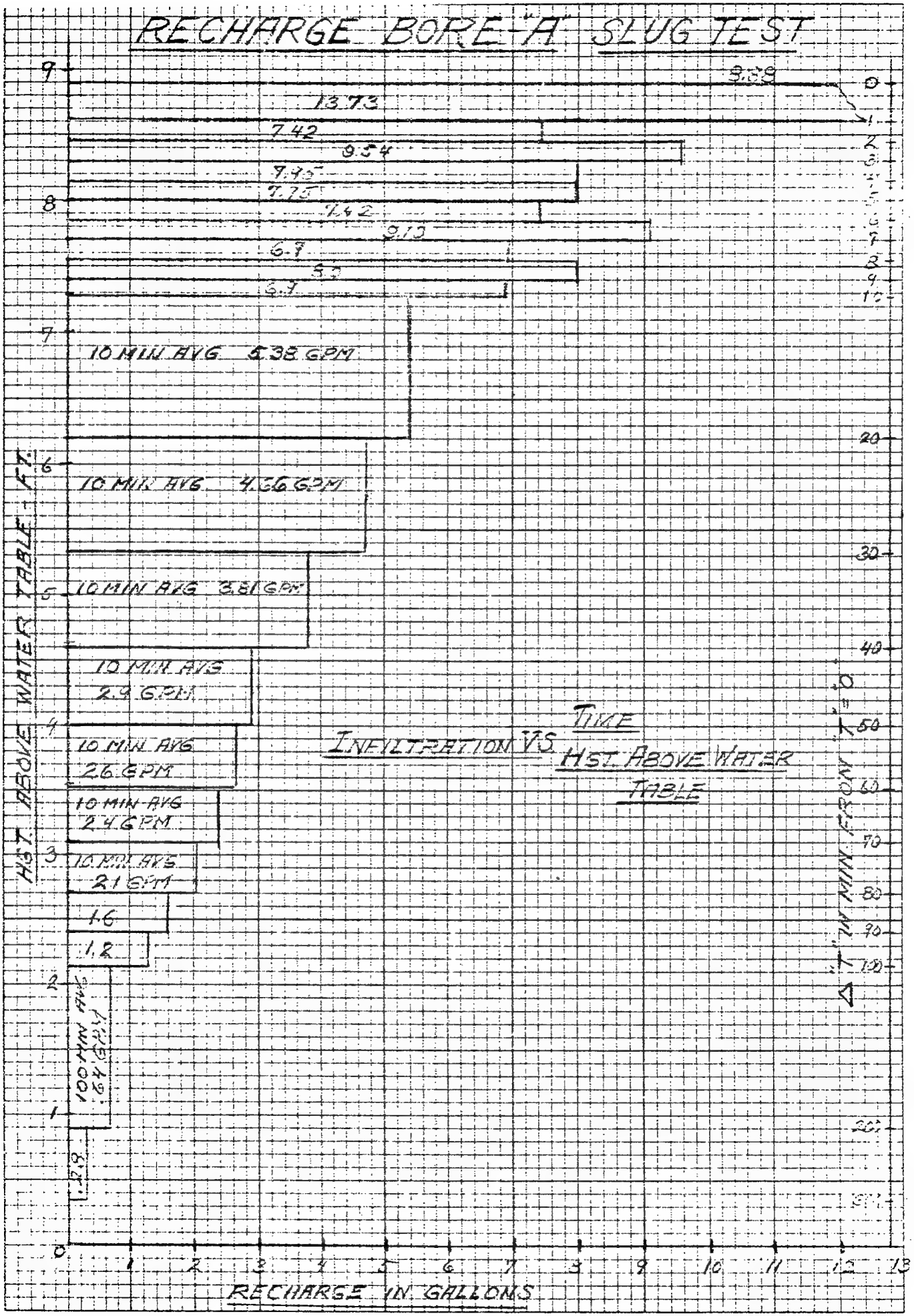
3 Two additional monitoring wells with 12 ft performated sections were located 5' and 25' down gradient from the edge of the 3 ft diameter casing.

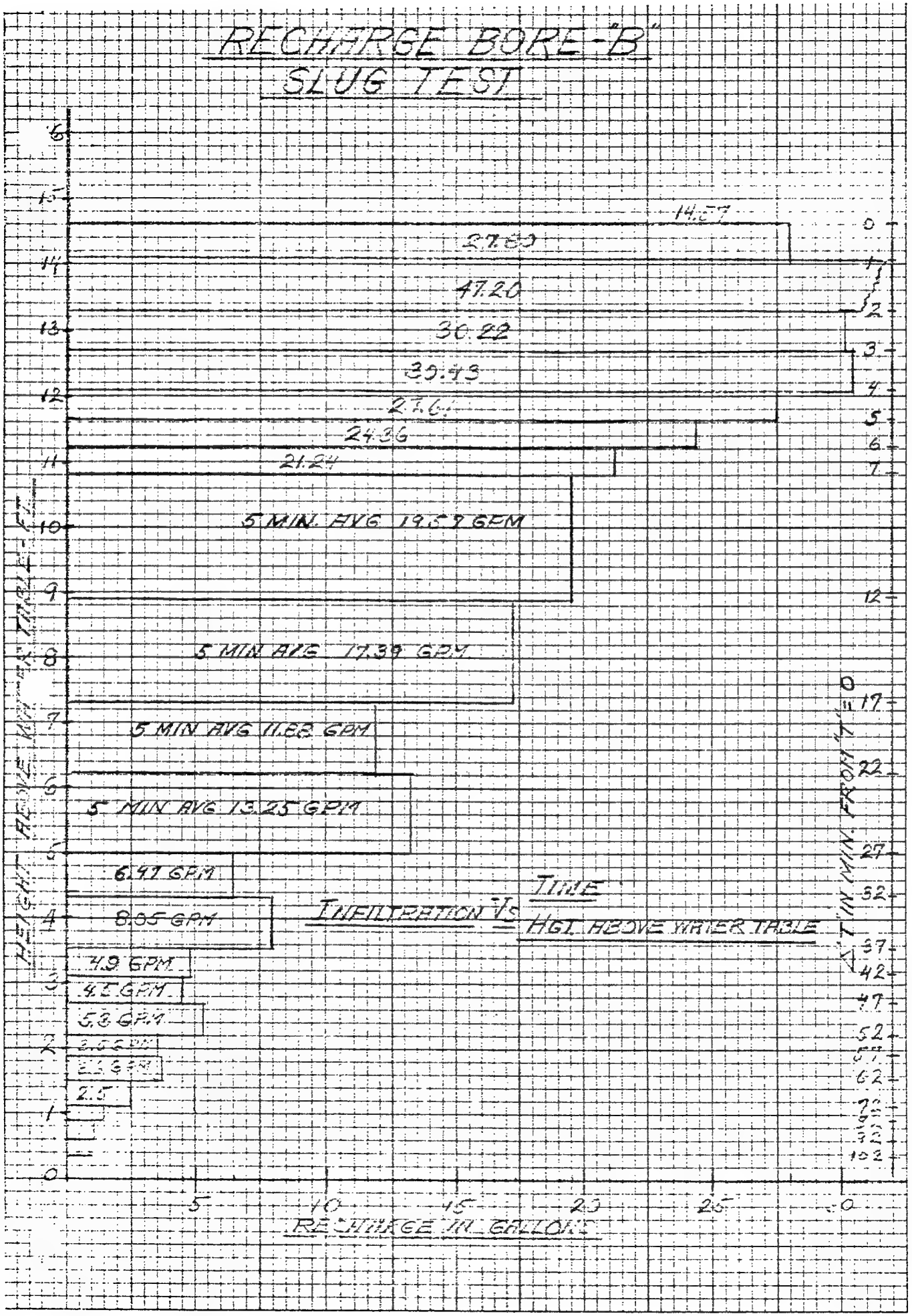
4 3/8 to 3/4" washed gravel, 2' thick down from water table

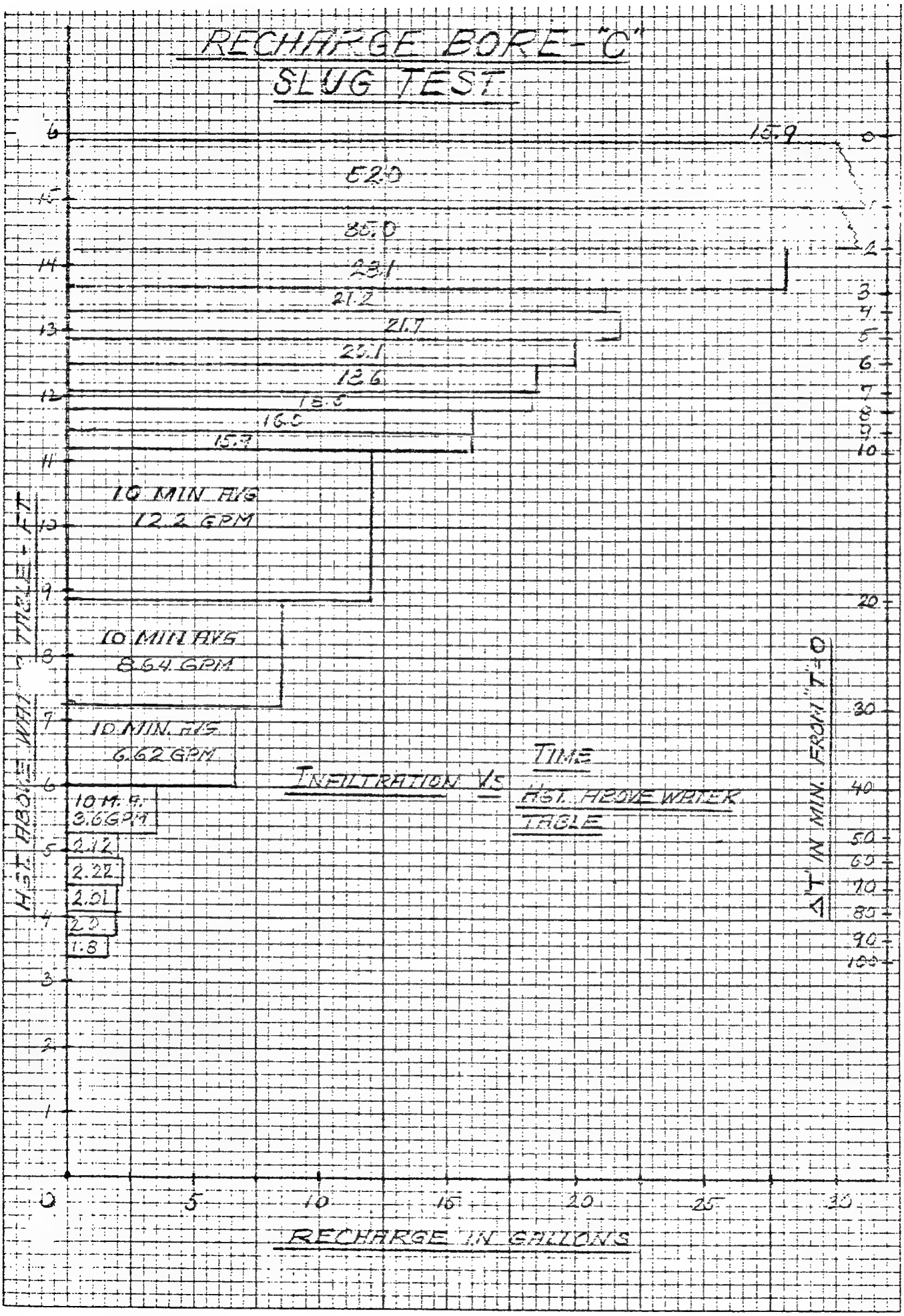
from the bottom of the casing. To install each casing, a 42" auger drilled inside a 1" thick steel drill casing down to water level; the 36" corrugated casing was then lowered inside the drill casing and allowed to drop below the aquifer. In bores "B" and "C" approximately 2 feet of 3/8 - 3/4 washed gravel was put down inside the corrugated casings and into the annular spacing between the drilland the corrugated casing. The drill casing was then removed, and the remainder of the annular spacing above the gravel was filled in with the natural ground material.

(7) Recharge bore "A" (chart 4) because of the thin layer of aquifer, was drilled approximately 6" into bedrock; next approximately 2 feet of washed gravel was placed down the drill casing; on top of this gravel the corrugated casing was placed; and an additional 2 feet of gravel put down inside the casing and in the annular space between the drill and 3 foot diamter casing. The drill casing was removed and the space filled with soil excavated from the hole and tamped down.

(8) The results of the slug tests are shown on charts 7, 8, and 9, infiltration vs height above water table and time. For bore "A" (chart 7) located on the west end maximum head from ground zero to static water table was 8.88 feet. At this head, the maximum infiltration was about 13 gpm; at ½ the maximum head height, the average infiltration was approximately 3 gpm. For bore "B" (chart 8), the maximum head was 14.57 feet above the static water level; the average


RECHARGE BORE "A" SLUG TEST
9.89
13.73
7.42
9.54
9.45
9.75
7.62
9.13
6.7
5.7
6.7
10 MIN AVG 5.38 GPM
10 MIN AVG 4.26 GPM
10 MIN AVG 3.81 GPM
10 MIN AVG 2.9 GPM
10 MIN AVG 2.6 GPM
10 MIN AVG 2.4 GPM
10 MIN AVG 2.1 GPM
1.6
1.2
100 MM PIPE
.78
HGT ABOVE WATER TABLE FT.
INFILTRATION VS TIME
HGT ABOVE WATER TABLE
Δ 1" IN 30 MINUTES
RECHARGE IN GALLONS
0
1
2
3
4
5
6
7
8
9
10
11
12
13
20
30
40
50
60
70
80
90
100
200





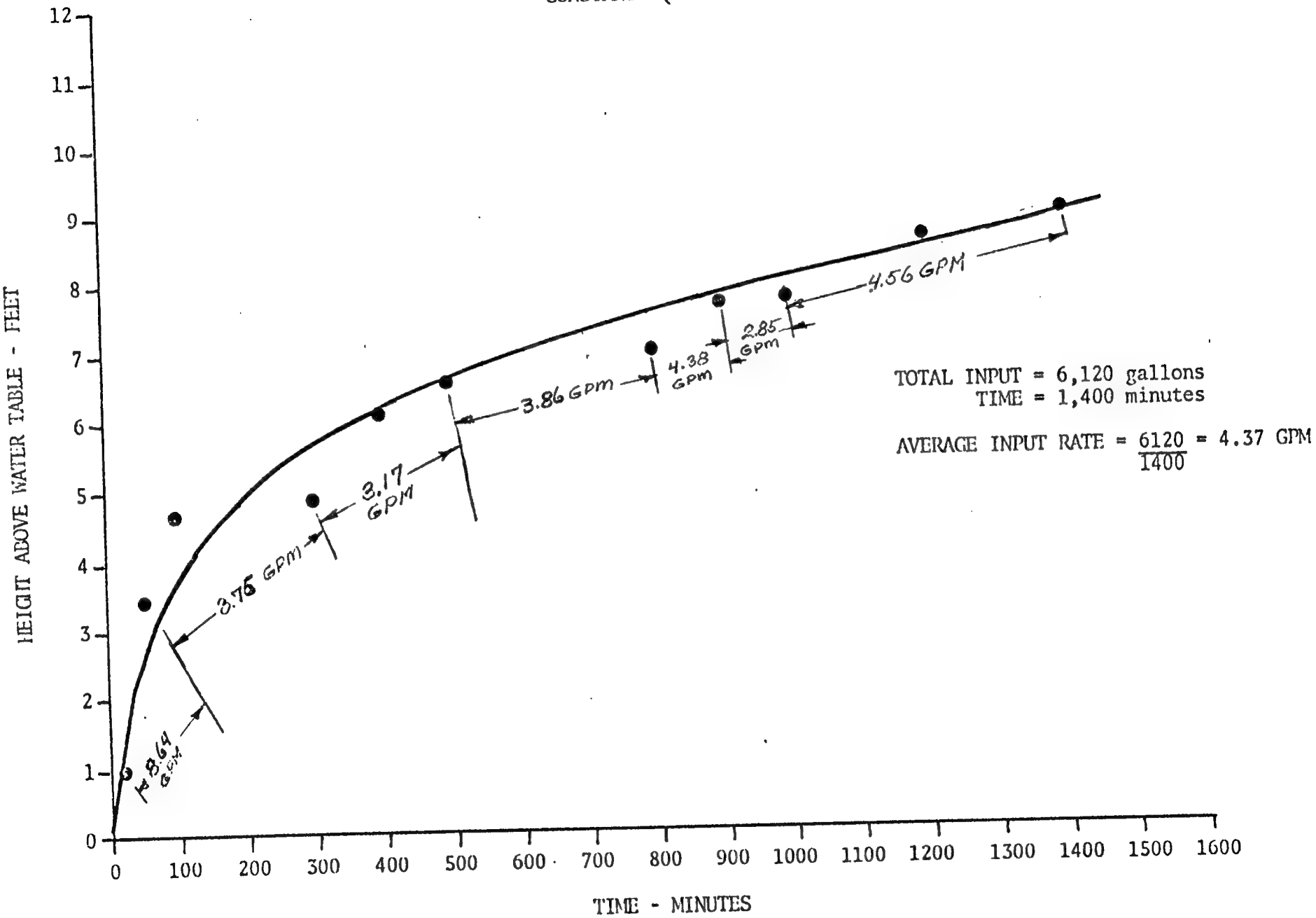
infiltration, combining the results obtained during the first 2 minutes showed about 37 gpm; the infiltration rate achieved at ½ maximum head height was approximately 15 gpm. Bore "C" (chart 9) which was expected to yield similar results to bore "B" because of their proximity to each other yielded approximately the same results. The slight variations were not significant for field testing of this type. The maximum infiltration rate at 16 feet was ≈ 50 gpm; at ½ the maximum head, the rate was about 11 gpm.

(9) The results of the slug test which represented transient and not steady-state conditions indicated that recharging the aquifer was certainly feasible, even under conditions where additional water was being added under existing aquifer conditions. In actual operating because of the presence of the barrier, the water that is being introducted back into the aquifer is essentially the same volume of water that would be in that part of the aquifer if no action was taken at all.

i. Phase II, the constant "Q" portion of the recharge tests, provided infiltration data which differed significantly from that obtained during the Phase I slug test of all three bores.

(1) Chart 10 depicts the results of the constant "Q" test for bore "A" located on the western end of the barrier. The total test was run for ≈ 1,400 minutes during which time 6,120

RECHARGE BORE A
CONSTANT "Q" TEST



TOTAL INPUT = 6,120 gallons
TIME = 1,400 minutes

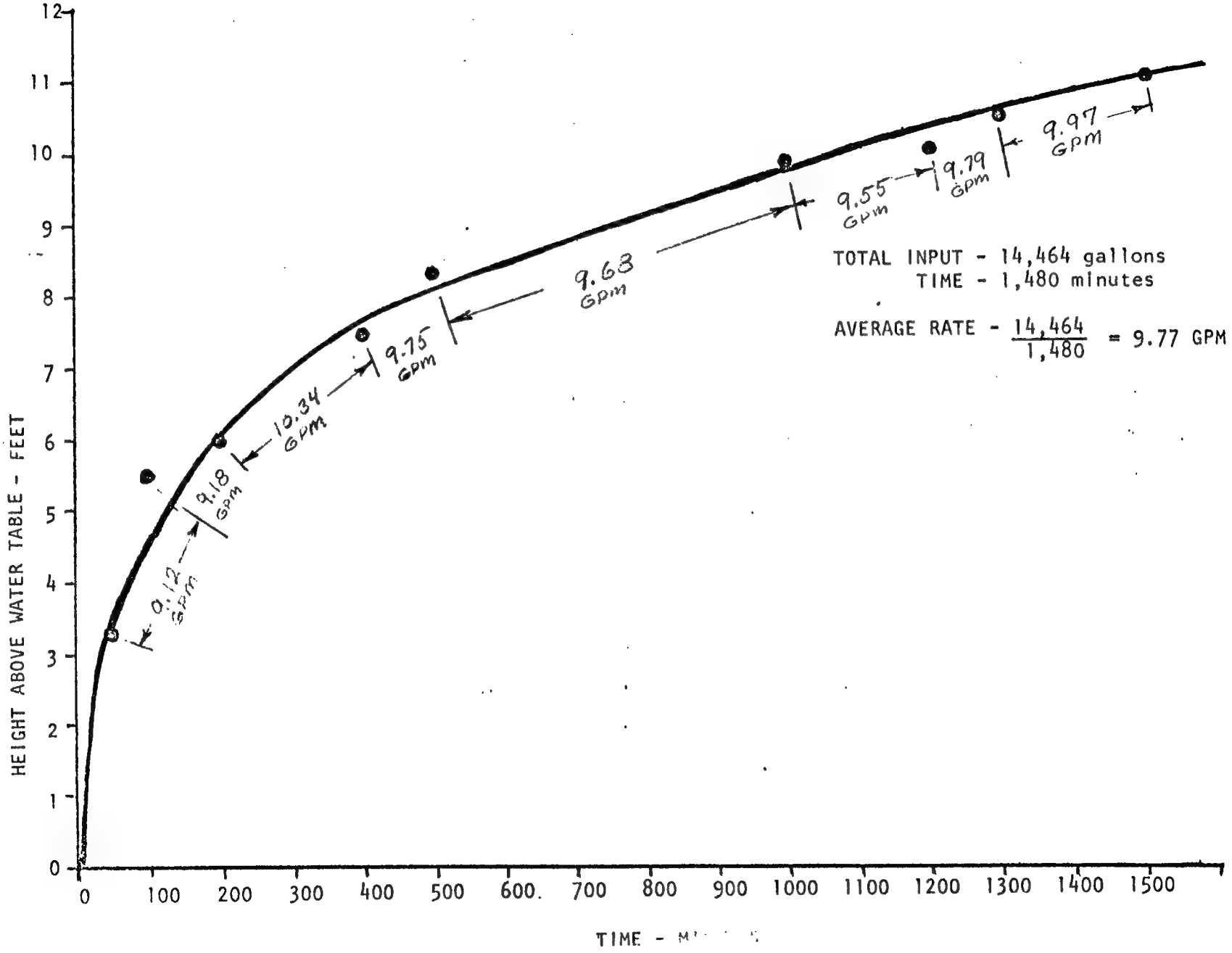
AVERAGE INPUT RATE = $\frac{6120}{1400}$ = 4.37 GPM

gallons were fed down the recharge bore. The average input rate for the test was 4.37 gpm. The various recharge rates were caused by surging in the line pressure and adjustments made to attempt to control a constant head.

(2) The significance of the test was that the bore at maximum head height could not sustain a rechrage rate great er than 3 gpm, which is considerably less than the maximum rate of 13 gpm achieved during the slug test. The 3 gpm rate is about equal to the rate achieved at ½ the maximum head during the slug test. The 3 gpm infiltration rate could be the maximum that can be achieved at steady-state in this area with a 3 foot diameter recharge bore; or the significant reduction in recharge rate could be caused by silting of the bottom of the bore, as the water from the bog carries considerable suspended solids. Additional tests are planned to determine the reason for the reduced rate of infiltration.

(3) Chart 11 -- bore "B" -- the total input was 14,464 gallons over a 1,480 minute time frame, for an average input rate of 9.77 gpm. The test was terminated after 1,500 minutes, as it was obvious that at the 9.77 gpm average, it was not going to level off at a constant height. Here again the slug test on bore "B" had showed a maximum recharge of 37 gpm and ½ head recharge of $\approx$ 15 gpm. From the 1,100 to 1,200 minute time period, it appears as though it might have leveled off at somewhere around 9 gpm; again, its possible that these conditions represent the

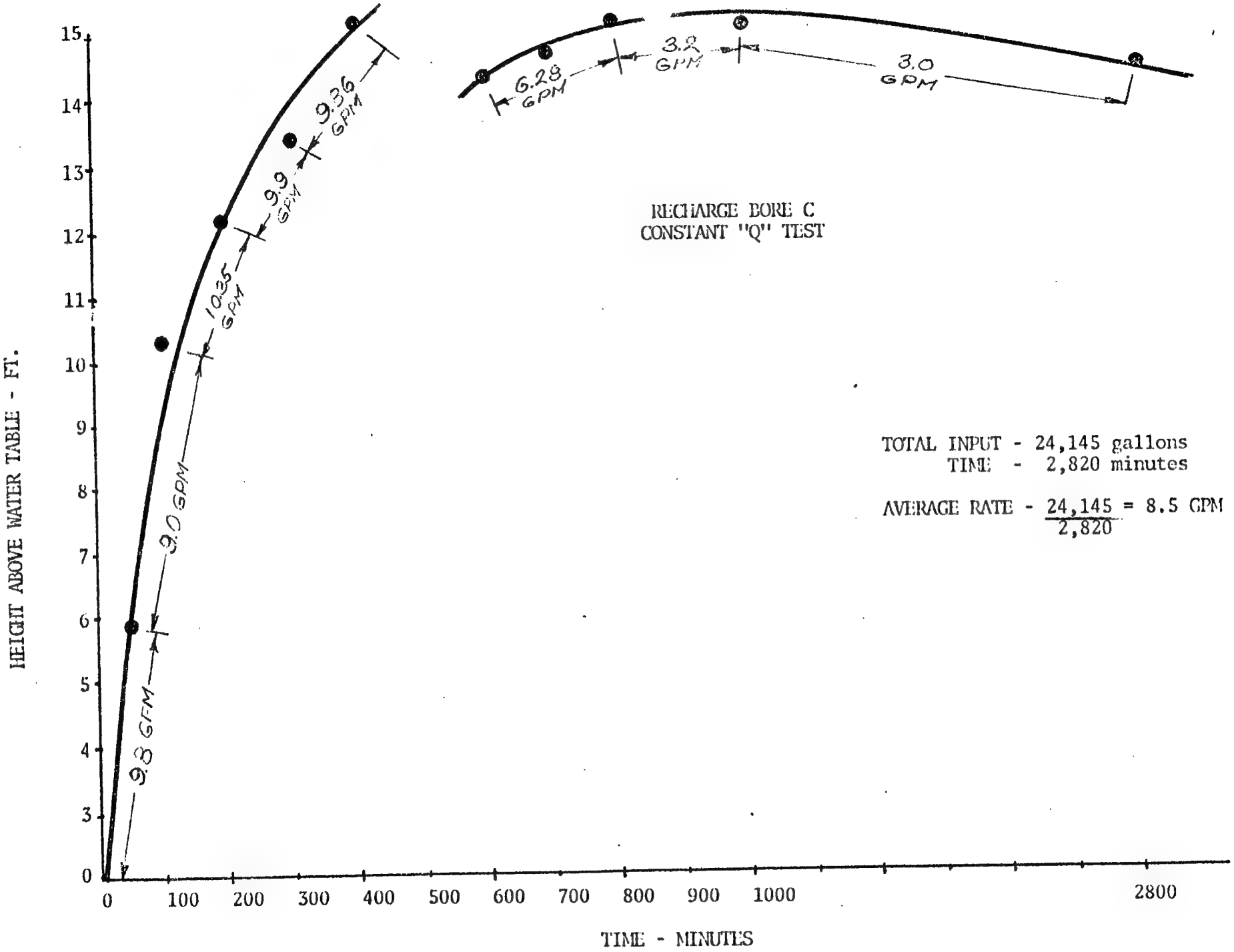
RECHARGE BORE B
CONSTANT "Q" TEST



maximum recharge at steady-state conditions; or the reduction in infiltration can be a result of the silt clogging up the recharge surface beneath the bottom of the bore. The present feeling is that the recharge area is choked with silt, reducing the recharge.

(4) The constant "Q" test on bore "C" (chart 12) showed the same trend, considerable reduction in infiltration compared to the slug test values. The maximum recharge rate at 16 feet of head was ≈ 50 gpm, and at ½ maximum head (8 feet) the rate was ≈ 11 gpm. The total input over 2,820 minutes was 24,145 gallons, for an average rate of 8.5 gpm. From T-0 to T-400 it was obvious a constant head could not be achieved at rates greater than 9 gpm. The recharge rate was reduced from T-600 to T-800 to 6.28 gpm and the head continued to rise. From T-800 to T-1,000 the head leveled off at approximately 15.5 feet at a rate of 3.2 gpm. With a 3 gpm average rate from T-1,000 to T-2,800, it dropped about 1 foot. The dramatic decrease in recharge rate was discussed with WES and USGS. The consensus of opinion is that recharge area is becoming clogged with the silt from the bog water.

(5) Bore "C" was purged after the recharge test by forcing water down through a 2½ diameter pipe extending five feet below the aquifer at a rate of 40 gpm to purge the fine silt from the aquifer. Simultaneously, the water was pumped out at approximately the same rate to remove any fine sediments which were purged out of the natural aquifer. This pumping was conducted for about



TOTAL INPUT - 24,145 gallons
TIME - 2,820 minutes

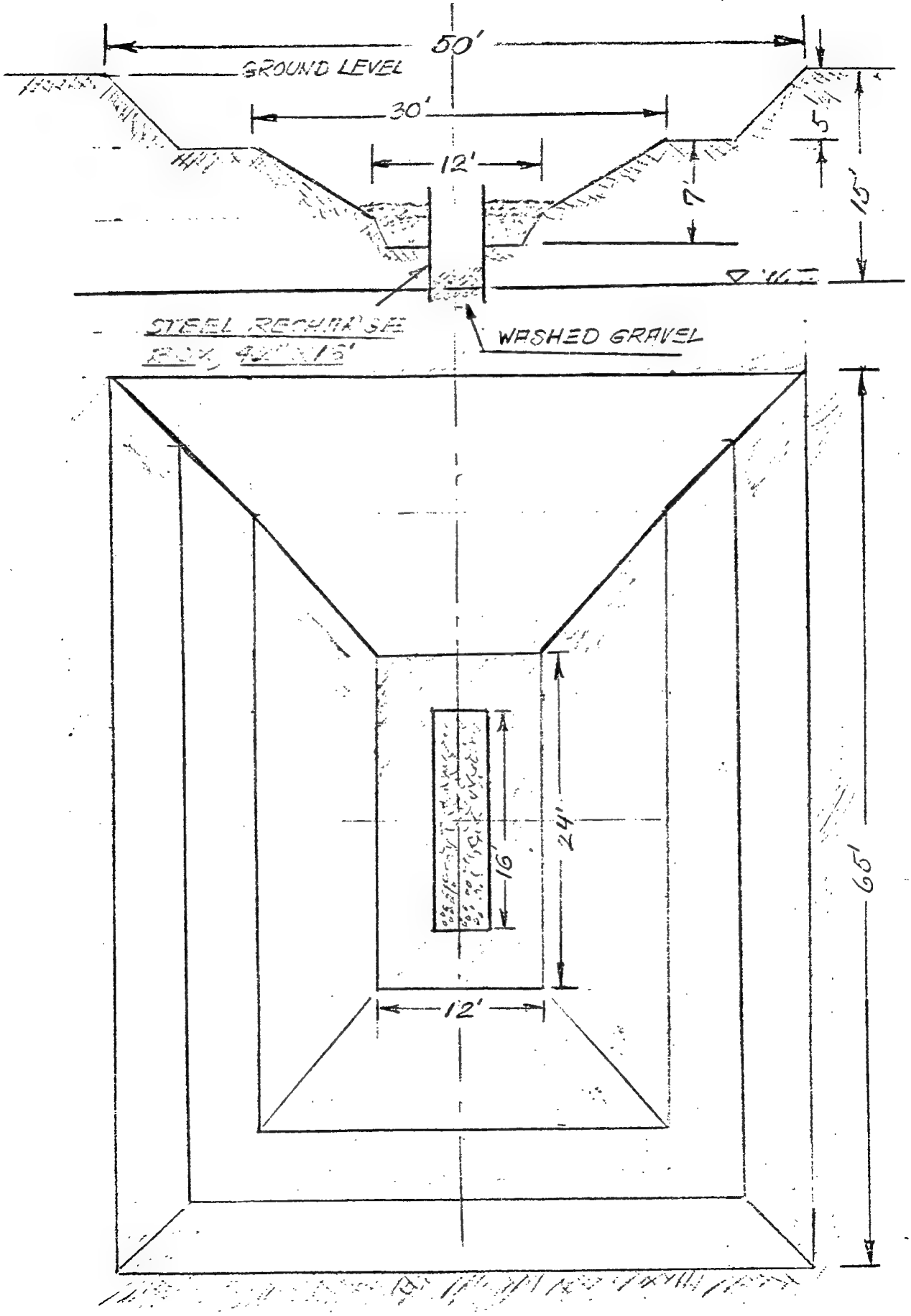
AVERAGE RATE - $\frac{24,145}{2,820}$ = 8.5 GPM

three hours. A recharge test was again conducted using potable water from an 8,000 gallon tanker. The purpose of using the potable water was to minimize the introduction of any suspended solids. A head height was chosen at 8 feet above the water table or ½ the maximum head height. The bore was recharged with 4,270 gallons over 375 minutes, with an average recharge rate of 11.4 gpm. The height never rose more than 9 feet above the water table. Considering the previous recharge test, the results indicate that clogging of the recharge area with fine sediments is causing the problem.

(6) An outside well driller is coming in this week to remove the material from the bottom of the bores with a mud pump; after which, additional testing wil be performed with well water or similar water with a minimum of suspended solids.

(7) Work is continuing on the construction of the recharge test trench. It is physically located on a line 75 feet south of the present recharge line and centered between bores "B" and "C". Chart 13 shows the general features of the trench. The actual recharge area will be 42 inches by 16 inches. The 42 inch width will allow maintenance to go in and clean out the gravel in the recharge area with a back-hoe whenever results indicate a reduced infiltration rate. The steel recharge bore is expected this week, and the recharge test will commence as soon as the gravel is in. Present testing calls for maintaining a five foot head above the water table. The design of the recharge test trench was developed for ease of maintenance

RECHARGE TEST TRENCH

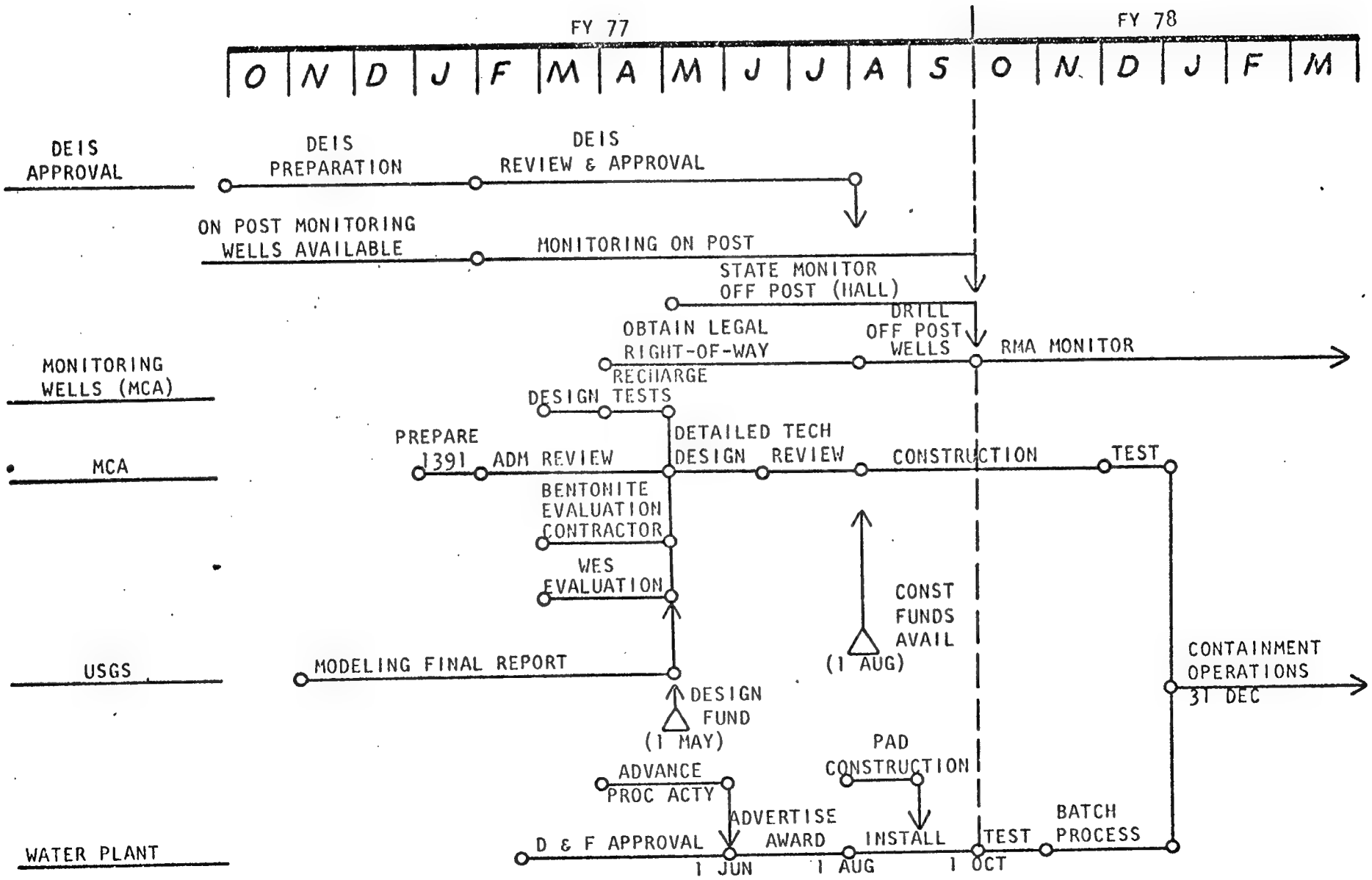


and construction with on post facilities and does not necessarily represent the design to be used if recharge trenches are finally decided upon.

(8) Chart 14 shows the major milestones associated with the pilot containment system. Basically, the overall schedule is tight with two areas that are exceptionally restricted. One is the completion of the recharge test so final design determination can be made, and the second is obtaining legal right-of-ways to install off-post monitoring wells. At this time, it is felt that design criteria can be developed and given to the DOF on the recharge system by 18 May.

MAJOR MILESTONES

PILOT CONTAINMENT WATER PROCESSING



COMPREHENSIVE SURVEY

1. A 16 core training test plot was positioned due south of the pilot plot in Section 36. Shake down of coring procedures, modification and development of protocols for collection, preparation, and transport of soil and water samples is progressing on schedule in preparation for the Comprehensive Survey.

2. After the test plot was surveyed and mapped, drilling commenced on schedule on 25 apr. Four of the 16 holes have already been drilled and cased for groundwater sampling.

3. Field measurements on the character of the soil stratigraphy including depths, texture, color, mottling, secondary mineralization, root content, etc., were logged. A computer program for storing and plotting the boring logs has been purchased and is being adapted for use.

4. A need for seven SOP's for the Comprehensive Survey has been identified. Preliminary drafts of three sets are complete as scheduled (see table).

5. A field soil core extruder was designed, built, and tested. A laboratory extruder is being designed for soil cores requiring tighter quality control; specifically, samples identified for chemical analyses.

6. Precise labeling procedures for tracking water and soil samples are being developed. Groundwater samples were taken at two depths in the saturated zone and analyzed for contamination.

7. Groundwater samples collected in Basin A are very muddy and recovery rate is slow. Procedures recommended by USGS for collection and preparation of water samples are being evaluated for adoption. These require collection of three (3) samples at each depth. One is to be filtered in the field, the second unfiltered, and the third is filtered and acidified to lower the pH. Instrumentation is being selected to field measure groundwater temperature, pH, electrical conductivity, and salinity.

8. Results from the precomprehensive survey effort revealed the following:

a. The bedrock topography in the Basin A area is much deeper than previously anticipated.

b. The bedrock consists of sandier facies of shale then along the northern boundary of the Arsenal and contains lenses of calcarious sandstone.

c. The average saturated thickness (31 feet) is much greater than anticipated and therefore the volume of groundwater underlying Basin A is much greater.

d. There are strong indications that groundwater from Basin A flows in a westerly direction and does not connect with the north boundary system. The flow pathway south of Basin F will be examined with seismic exploration.

e. The levels of contamination in the groundwater are abnormally high (see inclosed chart). At least six of the compounds exceed the recommended safe level.

f. The contaminants in the groundwater are stratified, with the levels at the water table surface being several times higher than at the bedrock surface for several of the compounds measured.

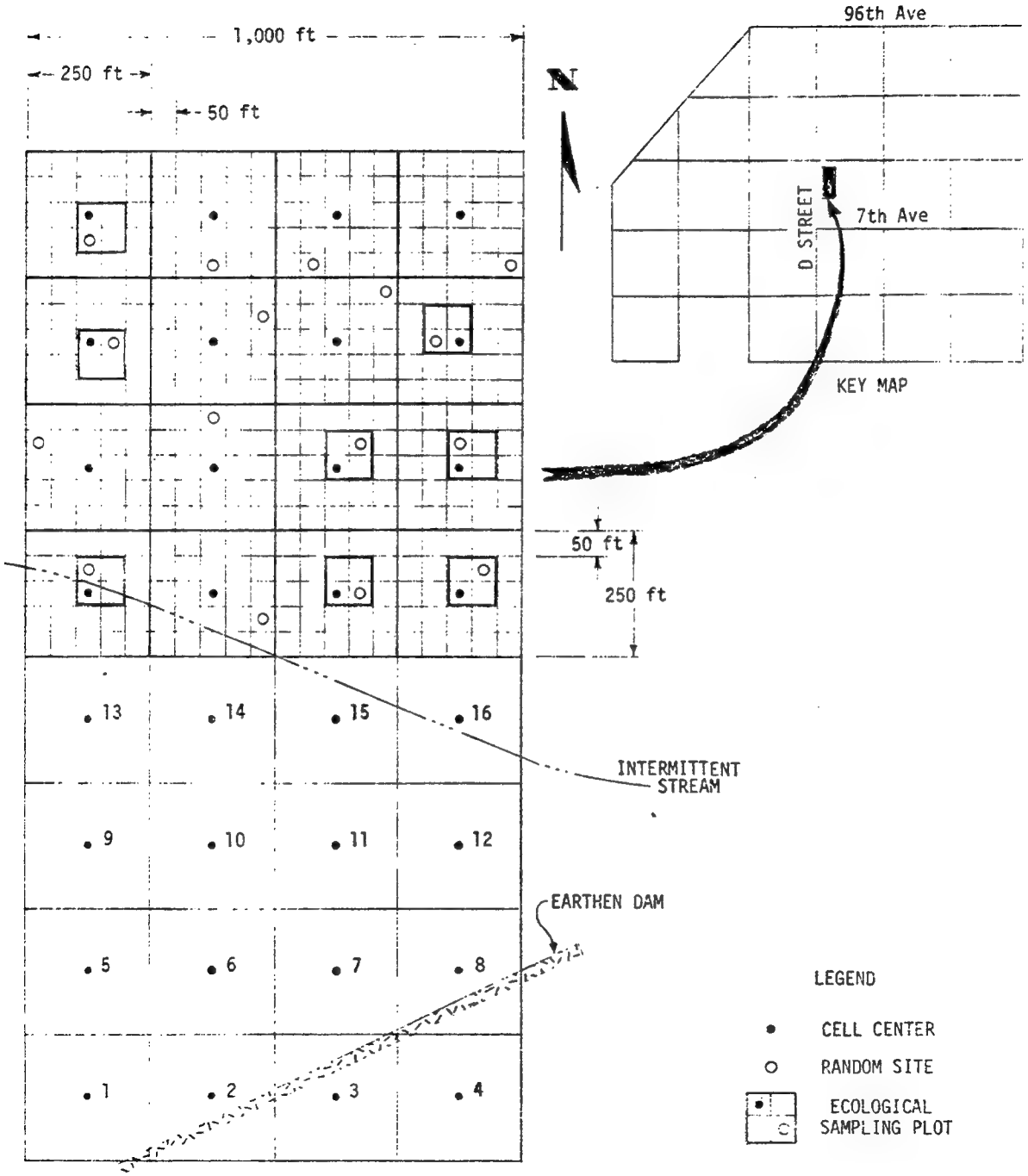
g. Wind transport of surface sediments is active in Basin A and can be a form of movement of surface contaminants.

COMPREHENSIVE SURVEY OBJECTIVES

1. IDENTIFY DEGREE OF ENVIRONMENTAL CONTAMINATION
2. MAP THE DISTRIBUTION OF CONTAMINATION
3. DETERMINE CONTAMINANT SOURCES
4. EVALUATE CONTAMINANT MIGRATION MECHANISM
5. EVALUATE CONTAMINANT MIGRATION VELOCITIES

COMPREHENSIVE SURVEY

TEST AND PILOT PLOT LAYOUT



COMPREHENSIVE SAMPLING SURVEY PILOT PHASE

CY 77 TARGET DATES	ACTIONS
20 DEC	PILOT SITE SELECTION
7 JAN	SURVEYING
1 FEB	BASE MAP PREPARATION
21 FEB	FIELD TEST OF SAMPLING LINERS.
25 APR	PILOT TEST/TRAINING PHASE -- DEVELOPMENT AND TESTING OF PROTOCOLS FOR COLLECTION, TRANSPORT, PREPARATION, AND STORAGE OF SAMPLES
22 JUN	COMPREHENSIVE SURVEY COMMENCES SOIL CORING -- INITIAL PHASE
5 AUG	SOIL CORING -- COMPLETE
21 OCT	COMPLETE DATA ASSESSMENT/DECISION PROCESS
24 OCT	ROUTINE OPERATIONS BEGIN

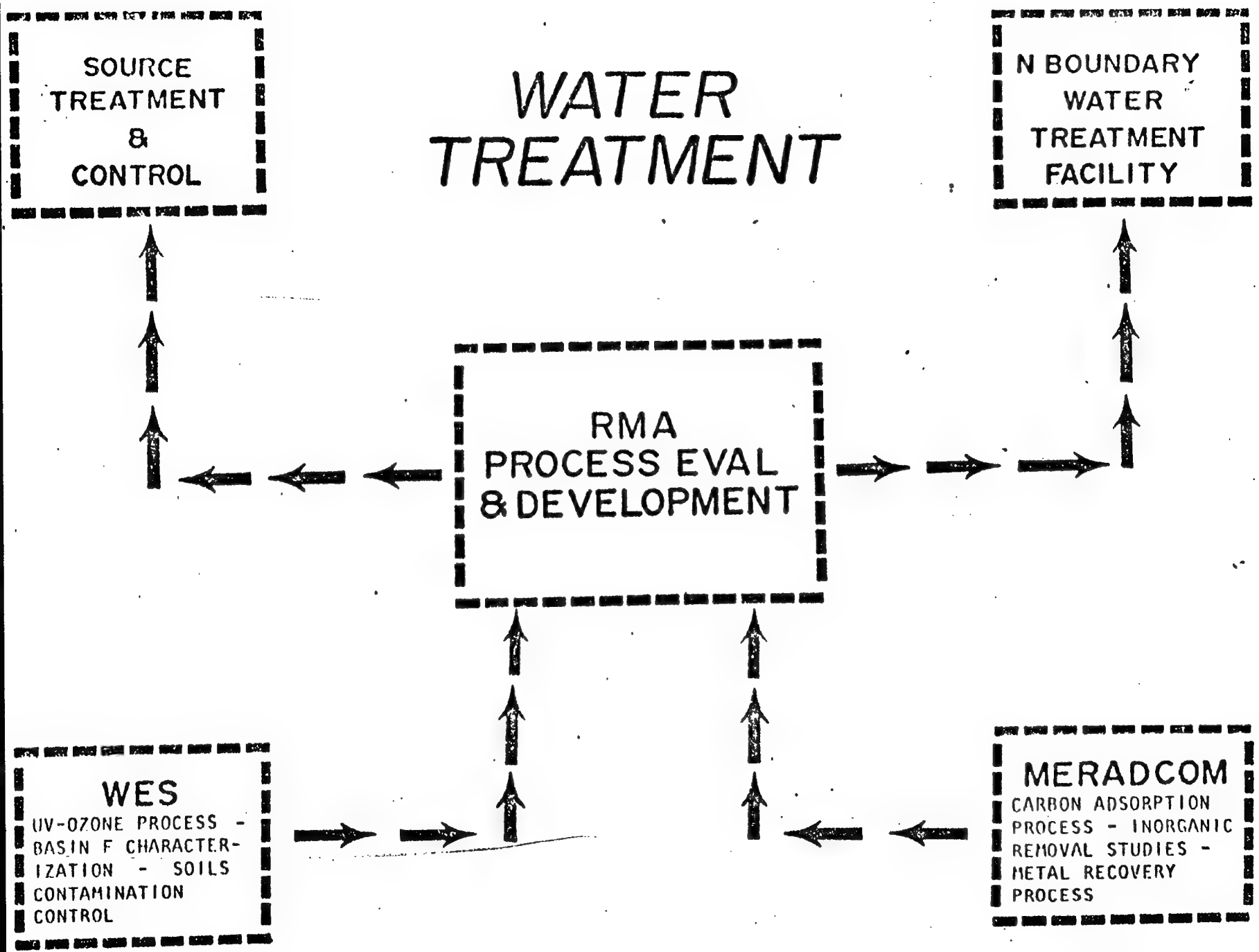
SCHEDULE OF SOP's FOR COMPREHENSIVE SURVEY

OPERATION	SOP NO.	PRELIM	FINAL	STATUS
FIELD COLLECTION OF SOIL SAMPLES FOR SOILS LAB	SARRM-IR-G1	29 APR	20 MAY	PRELIM COMPL
FIELD COLLECTION OF SOIL SAMPLES FOR CHEM LAB	SARRM-IR-G2	13 MAY	27 MAY	
FIELD COLLECTION AND PROCESSING OF WATER SAMPLES	SARRM-IR-G3	20 MAY	3 JUN	
INSTALLATION OF WELL CASING, TEMPORARY AND PERMANENT	SARRM-IR-G4	6 MAY	20 MAY	PRELIM COMPL
WASHING SAMPLE COLLECTION EQUIPMENT	SARRM-IR-G5	20 MAY	3 JUN	
PHYSICAL TESTING OF SOILS	SARRM-IR-G6	27 MAY	10 JUN	
HANDLING CONTAMINATED SAMPLES AND EQUIPMENT	SARRM-IR-G7	6 MAY	20 MAY	PRELIM COMPL

PREPILOT COMPREHENSIVE SURVEY
SECTION 36
6 MAY 77

PARAMETER	UNITS	STATE DRINKING WATER STD	PP-15 TOP	PP-11 TOP	PP-11 BOTTOM
CHLORIDE	PPM	250	8,250	3,120	8,010
FLUORIDE	PPM	2.4	0.1	2.90	1.30
NO2/NO3	PPM	10	< 0.04	0.11	0.50
PH	-	-	7.64	7.56	7.46
SULFATE	PPM	250	3,420	2,340	-
TOTAL HARDNESS	PPM	-	6,060	4,000	4,990
DIMP	PPB	500	1,466	55,778	13,424
DCPD	PPB	1,280	< 10	< 10	< 10
ALDRIN	PPB	-	< .5	2.2	1.4
DIELDRIN	PPB	-	< .5	< .5	< 0.5
ENDRIN	PPB	0.2	< .5	< .5	< 0.5
ISODRIN	PPB	-	< .5	12.4	8.4
SODIUM	PPM	250	3,300	3,000	3,620
ARSENIC	PPB	50	67	83	50
MERCURY	PPB	2	< 2	< 2	< 2

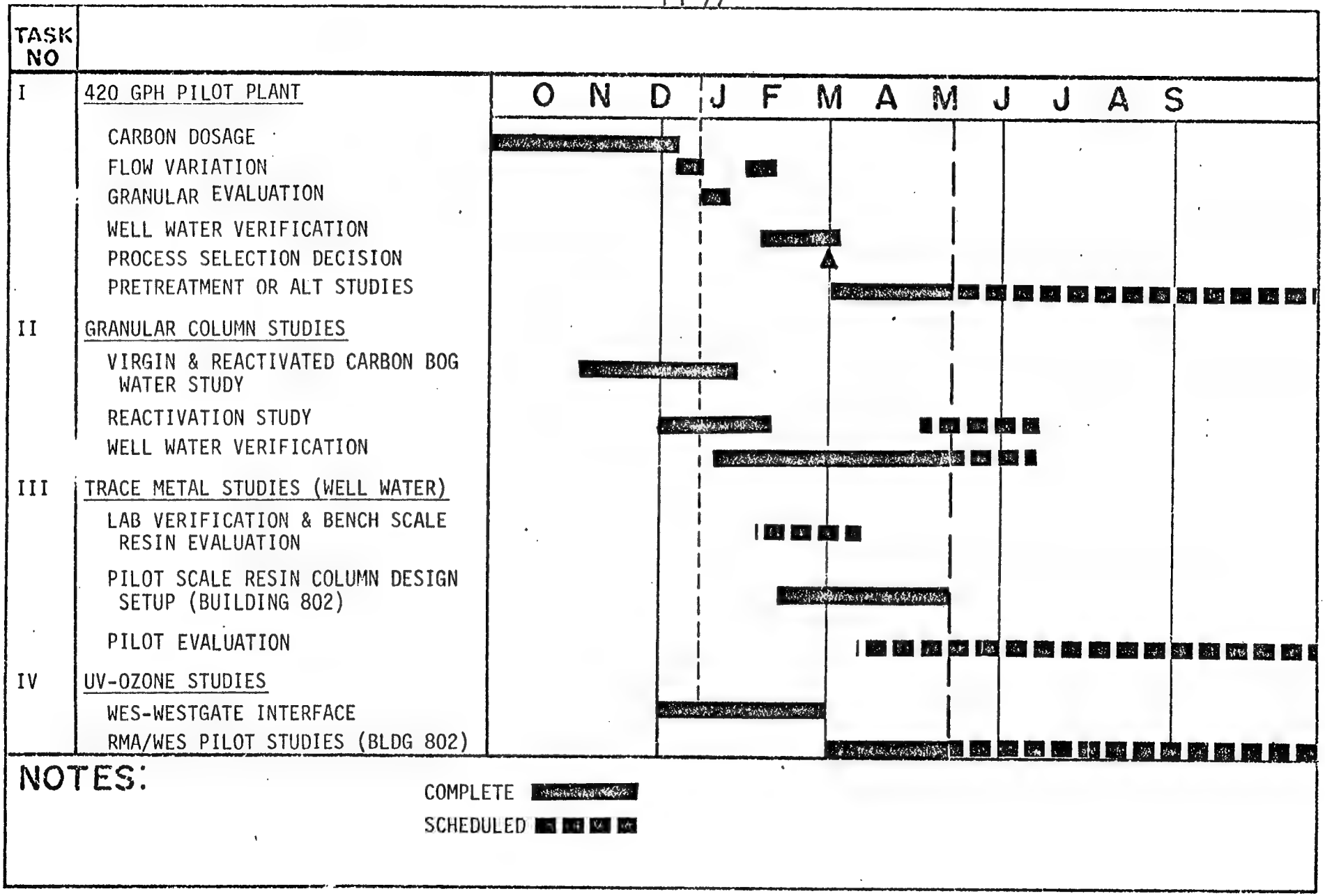
WATER TREATMENT



PROCESS TECHNOLOGY

INSTALLATION RESTORATION PROGRAM

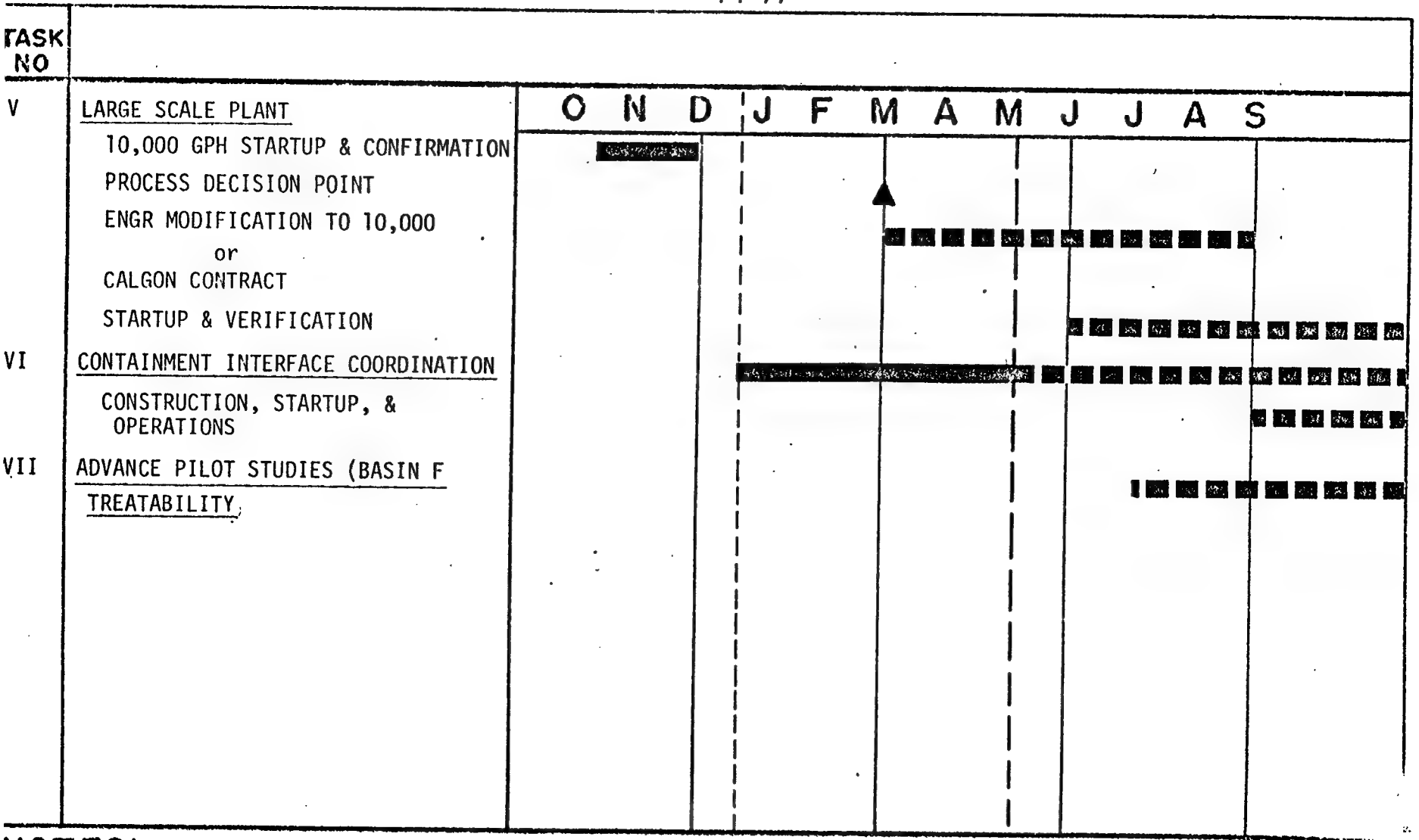
FY 77



PROCESS TECHNOLOGY

INSTALLATION RESTORATION PROGRAM

FY 77

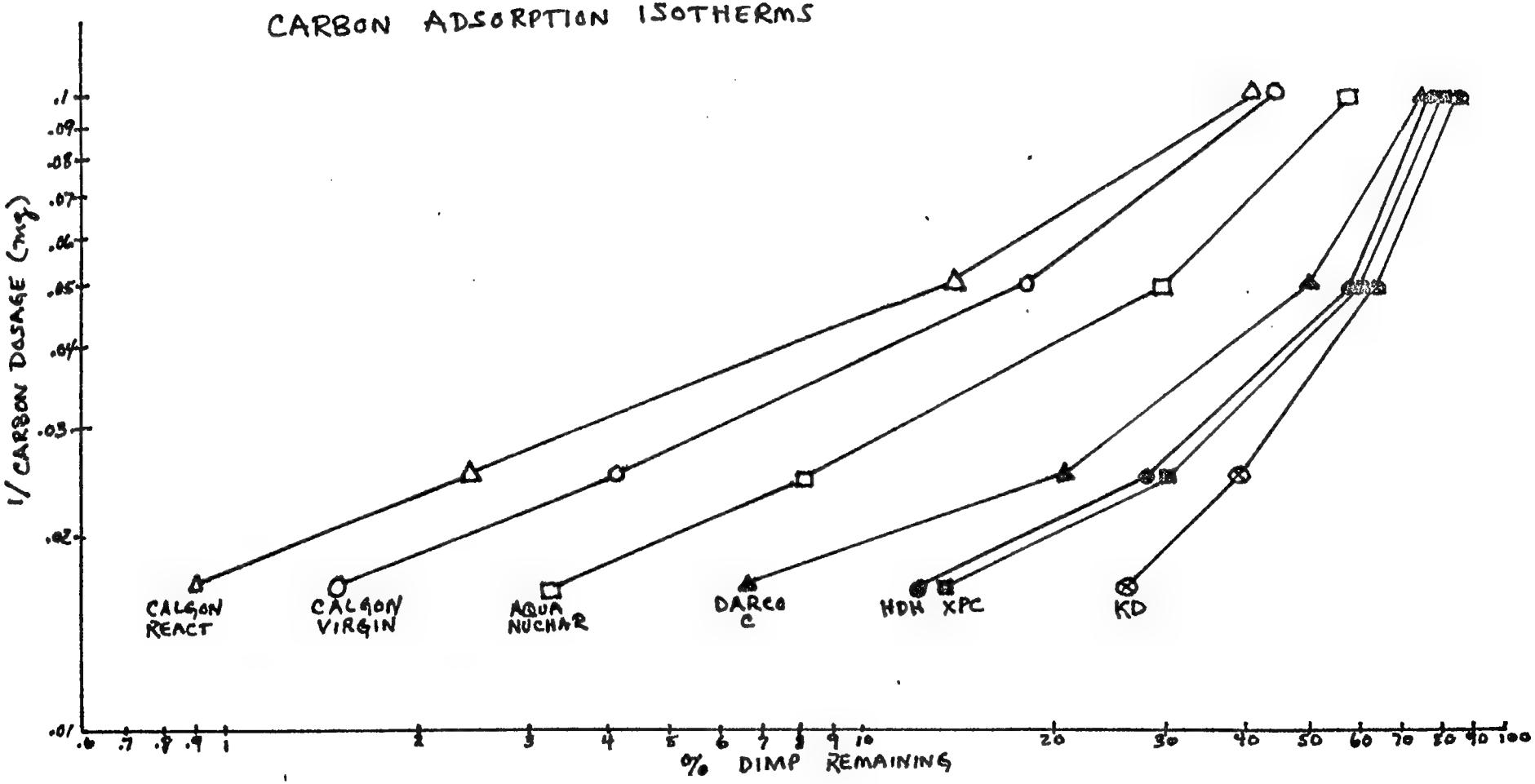


NOTES:

PROCESS TECH

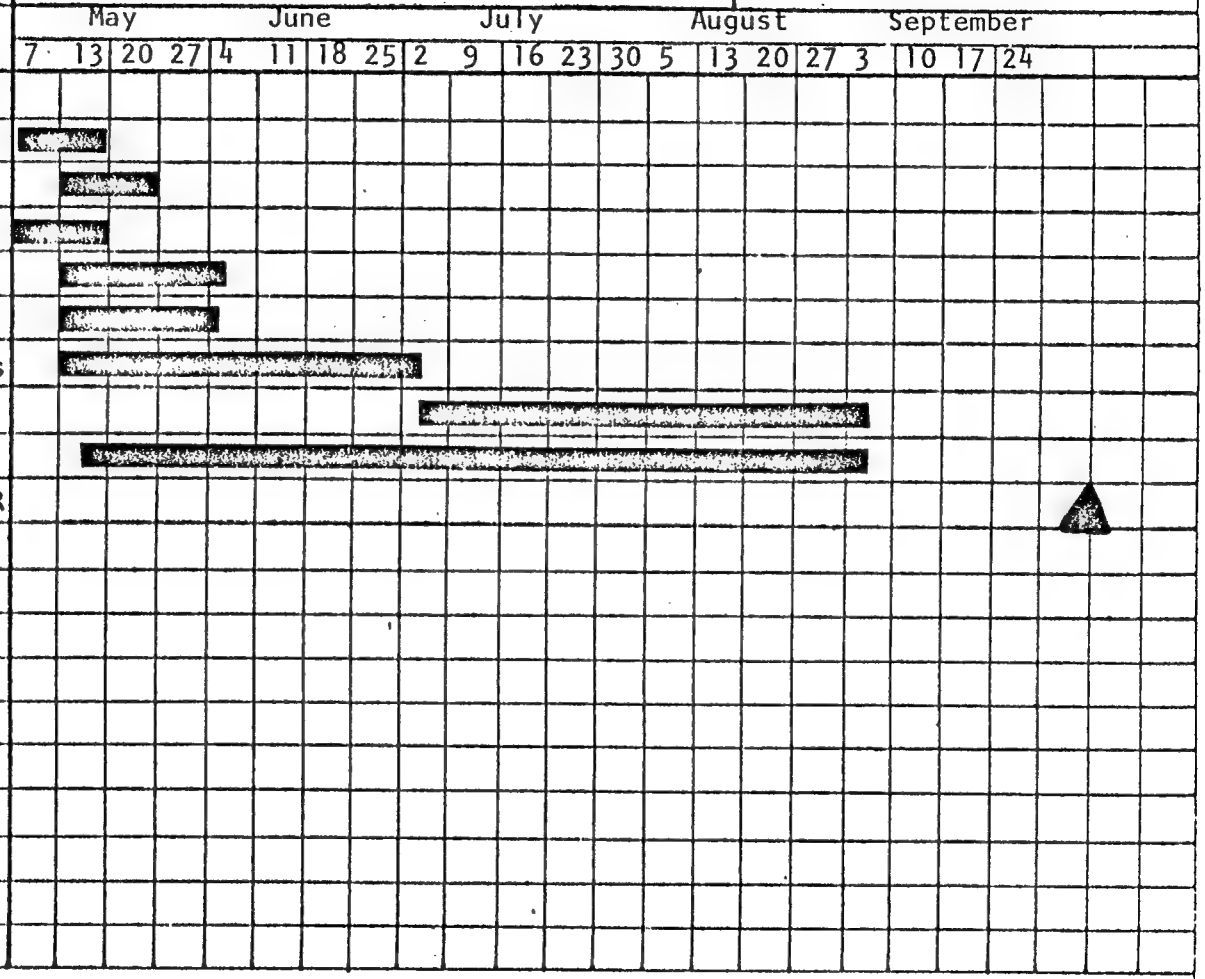
DECONTAMINATION TECHNOLOGY
FY 77 RDTE REVISED RESOURCES PLAN
$ (000)

	CURRENT COST	REVISED PLAN	TOTAL
DIRECT LABOR	66	104	170
420 GPH STUDIES	7	15	22
UV-OZONE/802			
RMA	-	60	60
WES	-	140	140
BASIN F			
RMA	-	25	25
WES	-	55	55
RESERVE F/CONTRACT	-	175	175
LARGE SCALE PLANT	48	-	48
USGS MODELING	25	-	25
RECHARGE TEST	-	10	10
TOTAL	146	584	730


CARBON ADSORPTION ISOTHERMS
1/CARBON DOSAGE (mg)
.1
.09
.08
.07
.06
.05
.04
.03
.02
.01
.6
.7
.8
.9
1
2
3
4
5
6
7
8
9
10
20
30
40
50
60
70
80
90
100
% DIMP REMAINING
CALGON REACT
CALGON VIRGIN
AQUA NUCHAR
DARCO C
HDH XPC
KD

RMA
Installation Restoration Program

Basin F Disposition Study
FY 77 Activity Plan



NOTES

INSTALLATION RESTORATION PROGRAM

ECO-SYSTEMS DIV
FY 77 ↓

ASK NO		O	N	D	J	F	M	A	M	J	J	A	S
I.	INVENTORY												
	Vegetation												
	Define Types of Vegetation	■	■	■	■	■							
	Detail Vegetation Map								■	■	■	■	■
	Mammal												
	Methods	■	■	■	■	■	■						
	Inventory (FY 78)												
	Birds												
	Fall Migratory												■
	Winter Residents		■	■	■	■							
	Breeding Cycle						■	■	■	■	■	■	
	Fish								■	■	■	■	
	Amphibian - Reptiles						■	■	■				
	Specific Invertebrate Study						■			■	■	■	■
II.	MONITORING						■	■	■	■	■	■	■
III.	COMPREHENSIVE PILOT STUDY						■	■	■	■	■	■	■

NOTES:

ECOSYSTEMS

1. Introduction

a. The purpose of this briefing is to provide insight and status of the on-going ecological projects at RMA.

b. These projects are divided into three parts: inventory or survey, monitoring, and ecological support of the Comprehensive Pilot Study.

2. Inventory Status

a. The inventory effort for the breeding bird census has started on its second year at RMA. Comparing our schedule from last year's expended manhours, 640 field manhours will be required. This cycle proceeds from 15 Mar through 7 Aug. All other inventories are on schedule.

b. Through inventory studies, diversities of population can be defined. Predominant species, median age of population, litter size of rodents, and clutch size in nesting birds are indicators of diversity. The reasons for diversity in population are important factors in ecological faunal studies. The cause and effect of these diversities has been equated to human populations.

3. Monitoring Status

a. Purpose is to monitor levels of contaminants present in various wildlife species. Whole body and tissues from selected flora and fauna were collected, prepared, and analyzed for organochlorine pesticides. The following table reflects the results (see viewgraph).

b. The fauna of concern are game fish, birds, and mammals where consumption of the game species could affect human health. This is preliminary data and should not be evaluated in total because of sample size, but these results are indicative of concentration of organochlorine pesticides present in the biota at RMA.

4. Comprehensive Eco Survey of the Pilot Plot

a. Trapping and collecting of rodent samples has been completed on the Pilot Plot, Section 36. Predominate species were field mice (Peromyscus maniculatus) and the thirteen-lined ground squirrel (Spermophilus tridecemlineatus). Preliminary population densities have been calculated and presented on the viewgraphs.

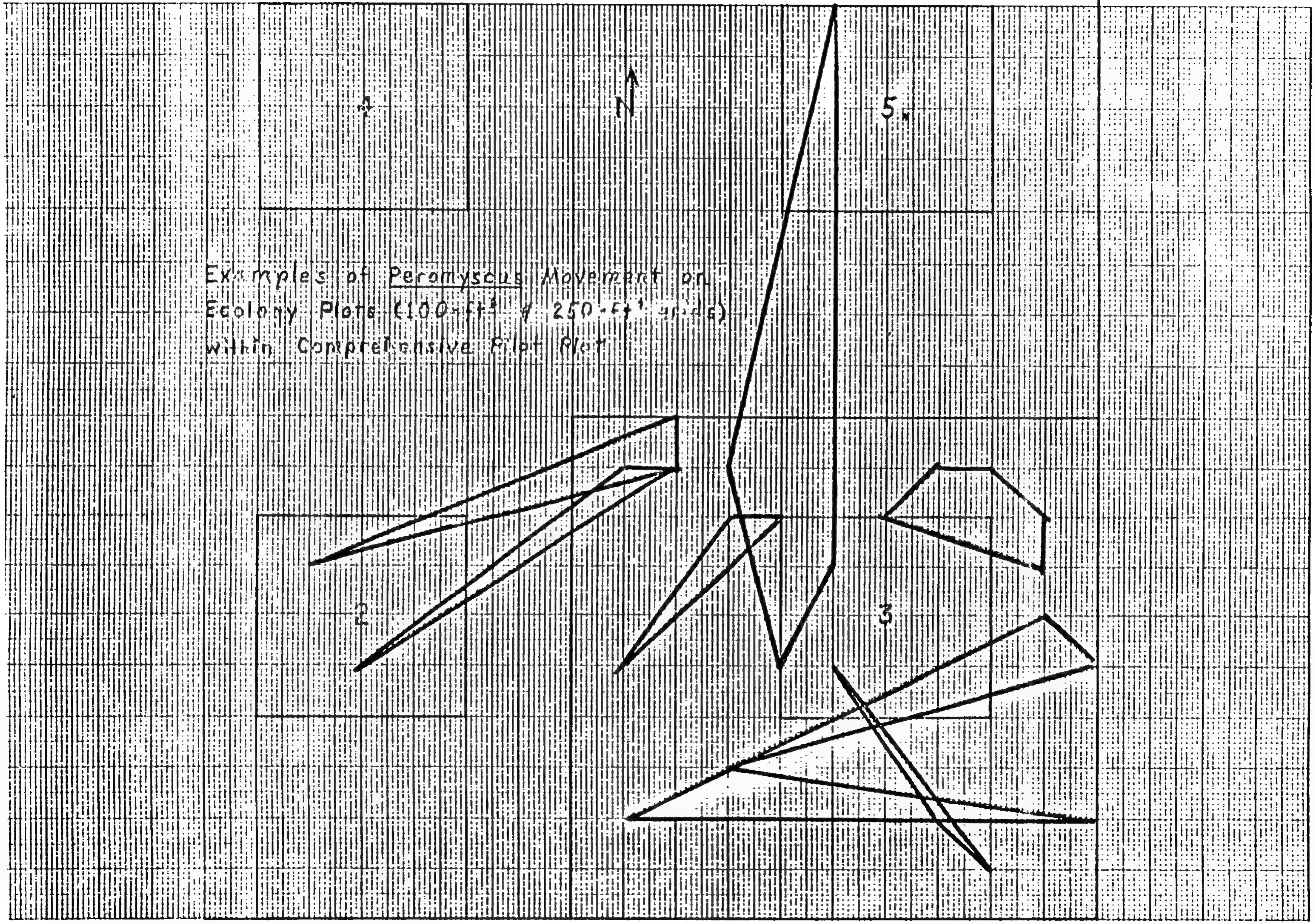
b. Preliminary population estimates were calculated for one week of live trapping using the Lincoln Index (i.e., the ratio of marked to unmarked captures in a sample) -- see Table 1 (viewgraph slide). Considering the relatively small sampling area (100 ft^2), population estimates were high. Although there are some small differences between plots, none of these appear

Pesticide Concentrations Found In RMA Biological Samples

SAMPLE LOCATION	CONCENTRATION (PPM)						
	NEMAGON	ALDRIN	DDE	DIELDRIN	ENDRIN	ISODRIN	HEPTACHLOR EPOXIDE
TROUT, LAKE MARY		.016	0.19	2.3	0.49		0.03
PRAIRIE DOGS (LIVER)		.04-.09	.08-.17	1.4-3.8		<.03-.01	0.04-0.1
BASS (FILET), LOWER DERBY		.24	.11	2.3	0.12	.05	
STARLINGS, B-III	0.02	0.18		3.7	0.13		
PLANTS		<.01-.03	<.01-.02	.02	<.01	.03-.06	<.01
DEER MOUSE	0.024						

SMALL MAMMAL POPULATION ESTIMATES (N, LINCOLN INDEX) ON 100 FT^2 TRAP GRIDS, COMPREHENSIVE PILOT STUDY, 4-8 APRIL 1977

GRID	PEROMYSCUS			SPERMOPHILUS			DIPODOMYS
	TRAPPED	N	SE	TRAPPED	N	SE	TRAPPED
1	4	4.0	2.8	1	1.0	-	0
2	3	3.0	1.2	8	7.0	1.2	0
3	6	6.7	2.4	2	1.0	-	0
4	5	6.0	14.7	3	3.0	-	1
5	10	6.7	4.5	1	1.0	-	1
6	7	2.7	0.6	7	7.0	-	0
7	8	6.0	4.9	1	1.0	-	0
8	6	6.0	5.5	7	8.0	5.7	1
X	6.1	5.1	0.8	3.8	3.6	3.1	0.4



Examples of *Peromyscus* Movement on Ecology Plots (100-ft² & 250-ft² grids) within Comprehensive Pilot Plot

to be significant (95% CL = N $\pm$ 2 SE overlap). While this small sampling unit appears to be adequate to estimate Peromyscus populations, it is not sufficient to accurately estimate Spermophilus numbers (note the lack of variation estimators, SE, for the latter).

c. In addition to the 8 small plots, a 250 ft^2 area around one of the small plots (#3) was also trapped. This was an attempt to gain some insight into the "effective" area sampled by the smaller plots -- Table 2. Expansion of the 100 ft^2 plot estimate (san Peromyscus) (N = 6.7) by a factor of 6.25 (the difference in plot sizes) yields an estimate of 41.86, within the 95% CL of the 250 ft^2 plot. Note that the longer plot is adequate to provide a reasonable estimate of the Spermophilus population. Peromyscus movement associated with the the two plot sizes is illustrated in Figure 1. The average maximum movement is 117.7 feet (N - 24; linear movement not shown -- range 25 - 327.5 ft). Of primary interest is the distance animals were located outside of the plot boundaries; averages were 67 feet for the 100 ft^2 plot and 142 feet for the 250 ft^2 plot. Adding these averages to their respective plot dimensions provides an estimate of the effective area trapped and actual density:

Plot	Dist (ft)	Area	Acres	Density (#/ac)
100 ft^2	67	167 ft^2	0.64	10.5
250 ft^2	142	392 ft^2	3.53	10.3

The resulting density estimates are surprising close; however, this correction procedure may be subject to error in that data (i.e., drop stations) are limited around both of the plots involved. If this adjustment procedure is accurate, than the effective sample area is 2.79 - times the 100 ft^2 plot size or only 2.4 Peromyscus would be expected to be found on the plot.

d. Finally, if all samples collected on a plot were expected to be unique to that plot alone (or at least nor mobile between plots), than plots should be located 350 feet or even further apart.

MAILED

MALD Division

During 2nd Quarter FY 77, the Material Analysis Laboratory personnel grew from eight to sixteen. These new positions were filled by two chemists and six technicians.

The major workload in MALD is divided into four major areas: Process Technology, Geohydrology, Methods Development/ID and Data Control. The support of Process Tech has involved daily sampling and analysis of waters from the 420 gph and Calgon granular carbon units. Geohydrology samples have involved the analysis of water from the 360° sampling program, north and northwest boundry test holes and miscellaneous samples from all over the Arsenal. Methods Development/ID has addressed the problems of creating methods for chemical analysis, identification of organic constituants in soil, ground water, and Basin F, development of biological testing methods, and identification of inorganic species in various water and soil samples. The Data Control effort has worked with lab data system in establishing routines for data handling and quality control.

Figure 1 is a summary of organic compounds found in Basin F. Many of these, primarily in the liner material, are in very high concentrations. It should also be noted that these compounds only represent the extractable organics. The water soluble organics have not yet been addressed and may produce as lengthy a list.

Figure 2 is a summary of the analyses performed on biological samples. These results reflect only the chlorinated pesticides, but as can be seen from the data, these chemicals are found in substantial concentrations and may pose a potential threat to wildlife.

The biggest concern to MALD, besides the ongoing projects, is the establishment of approved chemical methods of analysis for water, soil and biological samples.

Figure 3 is a list of the water and soil methods that are being developed and checked by MALD. From the chart it can be seen that fourteen of the eighteen methods required for water analysis are complete. Of these fourteen, eight have been QC tested and two have received Analytical Systems Committee approval. It is expected that all QC will be complete and methods submitted to the ASC before 1 June 1977. No soil methods have been fully developed, but techniques are currently being tested to finalize these as soon as possible. The biological methods have not been established, however, this effort will also be enhanced before the end of June.

COMPOUNDS IDENTIFIED FROM BASIN F

-3 MAY 1977-

COMPOUND	LOCATION				
	FLUID	SEDIMENT	LINER FROM SETTLING POND	SEDIMENT FROM SETTLING POND	VOLATILES FROM FLUID
METHYL ISOBUTYL KETONE	X				
CHLOROBENZENE	X				
DIMETHYL METHYLPHOSPHONATE	X				
TRIMETHYL PHOSPHATE	X				
DICHLOROBENZENES	X				
DCPD	X	X	X	X	X
1,4 DITHIANE	X		X		X
ALPHA-METHYLBENZYL ALCOHOL	X				
DIMP	X				
TRIBUTYLAMINE	X				X
4-CHLOROPHENYL METHYL SULFIDE	X		X	X	
4-CHLOROPHENYL METHYL SULFOXIDE	X		X	X	
4-CHLOROPHENYL METHYL SULFONE	X		X	X	
ALDRIN	X		X	X	
BLADEX	X	X	X	X	
DIMETHYL DISULFIDE*					
ACETIC ACID*	X				
DIISOPROPYL UREA	X				
4-NITROPHENOL*					
ALPHA-METHYLBENZYL ACETOACETATE	X				
DIPROPYLAMINE	X				X
1,4-THIOXANE	X				
N-ISOPROPYL ACETAMIDE*		X			
HEXACHLOROBUTADIENE		X	X	X	
HEXACHLORONORBORNADIENE		X	X	X	
HEPTACHLORONORBORNENE		X	X	X	
ISODRIN		X	X		
DIELDRIN		X	X	X	
CHLORDENE		X	X	X	

COMPOUND	LOCATION				
	FLUID	SEDIMENT	LINER FROM SETTLING POND	SEDIMENT FROM SETTLING POND	VOLATILES FROM FLUID
ENDRIN			X		
TETROCHLOROETHYLENE				X	
NEMAGON				X	
BIPHENYL	X				
DIPHENYL ETHER				X	

* TENTATIVE IDENTIFICATIONS

METHODS FOR CHEMICAL ANALYSIS

MALD
-3 MAY 1977-

	WATER METHODS	WRITE-UP COMPLETE	QUALITY CONTROL	ASC APPROVED
1.	Chloride	X		
2.	Fluoride	X		
3.	NO_2/NO_3	X		
4.	pH			
5.	Sulfate			
6.	Total Hardness			
7.	DIMP	X	X	X
8.	Sulfurs	X		
9.	Chlorinated Pesticides			
10.	Copper	X	X	
11.	Arsenic	X		
12.	Zinc	X	X	
13.	Mercury	X		
14.	Cadmium	X	X	
15.	Sodium	X	X	
16.	Potassium	X	X	
17.	Calcium	X	X	
18.	DCPD	X	X	X

Methods for Chemical Analysis

MALD
-3 May 1977-

SOIL METHODS	WRITE-UP COMPLETE	QUALITY CONTROL	ASC APPROVED
1. DIMP			
2. Sulfurs			
3. Chlorinated Pesticides			
4. Copper			
5. Arsenic			
6. Zinc			
7. Mercury			
8. Cadmium			
9. Sodium			
10. Potassium			
11. Calcium			
12. DCPD			

Milestones for Next Quarter Include:

1. Complete soil and water methods of analysis
2. Complete biological method development
3. Continue support of process technology
4. Final preparation for pilot comprehensive study
5. Implement daily quality control program
6. Utilize data system to eliminate as much as possible manual reporting of data

INSTALLATION RESTO .TION PROGRAM

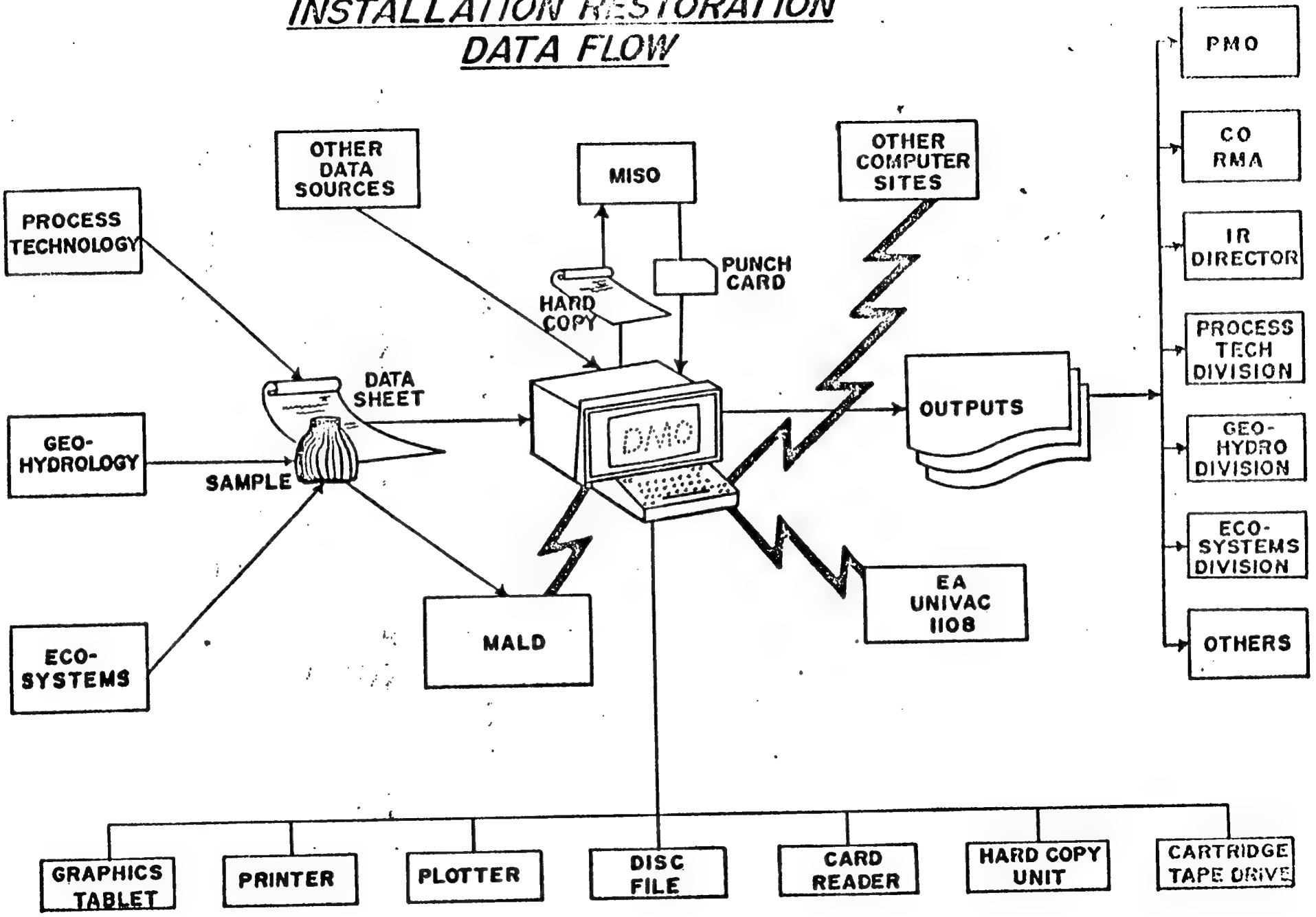
TASK NO.	DEVELOPMENT OF PROCEDURES FY 77	O	N	D	J	F	M	A	M	J	J	A	S
IV.	GEOHYDROLOGY												
	1. Field collection of soil samples for soils laboratory SARRM-IR-G1							29 Δ		20 Δ			
	2. Field collection of soil samples for chem lab SARRM-IR-G2								13 Δ	27 Δ			
	3. Field collection and processing of water samples SARRM-IR-G3									20 Δ	3 Δ		
	4. Installation of well casing, temporary and permanent SARRM-IR-G4							6 Δ	20 Δ				
	5. Washing sample collection equipment SARRM-IR-G5									20 Δ	3 Δ		
	6. Physical testing of soils SARRM-IR-G6									27 Δ	10 Δ		
	7. Handling contaminated samples and equipment SARRM-IR-G7							6 Δ	20 Δ				

NOTES: First Δ = Preliminary draft
Second Δ = Final IR staffed procedure (includes quality control board review)
Number above Δ = Day of month for completion of indicated milestone

DATA MGT

ROCKY MOUNTAIN ARSENAL

INSTALLATION RESTORATION DATA FLOW



INSTALLATION RESTORATION
DATA MANAGEMENT OFFICE
RESPONSIBILITIES

A. Systems Analysis - Design and implement data collection, processing and feedback/output system for all functional activities under installation restoration.

B. Programming - Prepare, debug and operate all computer and terminal programming as required to satisfy the technical and management needs of PMO and RMA.

C. Mathematical Modeling - Develop mathematical models to portray and test intra- and inter-actions of functional systems.

D. Statistical Support - Provide statistical support to all functional activities in defining data needs, performing analyses required and interpretation of results.

E. Coordination - Serve as focal point for all data handling within the IR directorate and assure compatibility with and current status of IR master data system.

INSTALLATION RESORATION
DATA MANAGEMENT OFFICE
ACTIVITIES
"ECO-SYSTEMS SUPPORT"

SIGNIFICANT ACCOMPLISHMENTS TO DATE

* 1. VEGETATION SURVEY

A. 1976 DATA -- 3,227 RECORDS LOADED IN MDB SEP 76.

B. 1975 DATA -- 1,206 RECORDS SENT TO MDB 7 MAR 77.

C. CLUSTER ANALYSIS PROGRAM WRITTEN AND COMPLETED FEB 77. RESULTS ANALYZED BY DR. TIMOFEEFF PROVED INCONCLUSIVE. OTHER ANALYTICAL PROCEDURES ARE BEING STUDIED.

* 2. WOODLAND VEGETATION

352 RECORDS LOADED IN MDB DEC 76.

3. GENERAL OBSERVATIONS

1,168 RECORDS SENT TO MDB 7 MAR 77.

4. PRE-PILOT MONITORING DATA COLLECTION IS UNDERWAY.

CURRENT AND/OR PLANNED ACTIONS

1. VEGETATION SURVEY -- NO ADDITIONAL DATA COLLECTION PLANNED AT THIS TIME.

2. WOODLAND VEGETATION -- NO ADDITIONAL DATA COLLECTION PLANNED AT THIS TIME.

3. DATA COLLECTION CONTINUES ON GENERAL OBSERVATIONS.

4. DATA FORM FOR SPOT MAPPING UNDER DEVELOPMENT.

5. ESTABLISH NUMBERING PROCEDURE PROCEDURE FOR SAMPLES SENT TO MALD.

6. 1976 BIRD INVENTORY DATA MUST BE TRANSCRIBED TO GENERAL OBSERVATIONS FORM.

* NO FURTHER ANALYSIS OF 1 AND 2 DATA HAS BEEN IDENTIFIED DUE TO UNAVAILABILITY OF STATISTICIAN.

INSTALLATION RESTORATION
DATA MANAGEMENT OFFICE
ACTIVITIES
"GEO-HYDROLOGY SUPPORT"

SIGNIFICANT ACCOMPLISHMENTS TO DATE

1. COMPREHENSIVE SURVEY (PILOT PHASE)

   A. RMA MAPPING SYSTEM

      1) A MAPPING PROGRAM HAS BEEN DEVELOPED WHICH GENERATES A MAP OF ALL OR ANY PORITION OF THE ARSENAL AND PLOTS RELATED POINTS WITH DATA LABELS.

      2) A TAPE FILE OF SURVEYED WELL LOCATIONS HAS BEEN CREATED ALONG WITH APPROPRIATE FILE MANAGEMENT PROGRAMS.

      3) NUMEROUS PRELIMINARY MAPS HAVE BEEN GENERATED UTILIZING THE CAPABILITIES IN 1) and 2).

      4) MAPPING SYSTEM HAS BEEN UP-DATED TO INCLUDE BOUNDRY AND SECTION COORDINATES SUPPLIED BY DOF.

CURRENT AND/OR PLANNED ACTIONS

1. FURTHER DEVELOPMENT OF THE MAPPING PROGRAM CONTINUES.

2. WATER QUALITY PLOTTING PROGRAMS ARE IN THE DESIGN STAGE.

3. A GRAPHING PROGRAM FOR WATER LEVEL MEASUREMENTS IS UNDER DEVELOPMENT.

4. EXTENSIVE CONVERSION OF LOG BOOKS AND MISCELLANEOUS RECORDS TO MDB ACCEPTABLE FORMATS AND LOADING OF THE MDB.

5. UTM-COLO STATE PLANER COORDINATE CONVERSION PROGRAMS HAVE BEEN SUPPLIED BY CSL AND ARE IN CHECKOUT PROCESSING.

INSTALLATION RESTORATION
DATA MANAGEMENT OFFICE
ACTIVITIES
"GEO-HYDROLOGY SUPPORT" CONT

SIGNIFICANT ACCOMPLISHMENTS TO DATE

CURRENT AND/OR PLANNED ACTIONS

B. WATER QUALITY TAPE FILE DATA BASE

1) AN OPERATIONAL TAPE FILE DATA BASE HAS BEEN ESTABLISHED WITH RELATED FILE MANAGEMENT PROGRAMS.

2) DATA STORED TO DATE CONSISTS OF APPROXIMATELY 1400 ANALYTICAL RESULTS.

3) WATER QUALITY DATA SHEETS HAVE BEEN SENT TO EA FOR CONVERSION INTO MDB FILES.

4) STANDARD REPORT GENERATIONS PROGRAM COMPLETED.

C. WATER LEVEL MEASUREMENT TAPE FILE DATA BASE

1) DATA BASE DESIGN AND FILE MANAGEMENT PROGRAMS HAVE BEEN COMPLETED.

2) APPROXIMATELY 560 SAMPLES FROM ARSENAL SECTIONS 23 AND 24 HAVE BEEN LOADED.

3) STANDARD REPORT GENERATION PROGRAM COMPLETED.

INSTALLATION RESTORATION
DATA MANAGEMENT OFFICE
ACTIVITIES
"GEO-HYDROLOGY SUPPORT" CONT

SIGNIFICANT ACCOMPLISHMENTS TO DATE	CURRENT AND/OR PLANNED ACTIONS

D. SOIL DATA

1) SURGEON GENERAL SOIL DATA LOCATIONS HAVE BEEN STORED AND MAPS HAVE BEEN GENERATED.

2) INITIAL SOIL AND TOPOGRAPHY DATA COLLECTION FORMS HAVE BEEN COMPLETED FOR USE IN COMPREHENSIVE SURVEY.

2. INTERIM CONTAINMENT PROGRAM

A. OVERLAP ACTIVITIES/ACCOMPLISHMENTS WITH 1. ABOVE.

B. A WES GROUND PROFILE PROGRAM HAS BEEN LOADED AT CSL AND IS IN PROCESS OF BEING CHECKED OUT.

INSTALLATION RESTORATION
DATA MANAGEMENT OFFICE
ACTIVITIES
"MATERIAL ANALYSIS LABORATORY"

SIGNIFICANT ACCOMPLISHMENTS TO DATE

1. MDB HAS 31161 WATER QUALITY RECORDS LOADED.

2. COMMUNICATIONS LINK BETWEEN LAB AND BLDG-612 HAS BEEN ESTABLISHED AND OPERATING.

3. SUBMISSION OF HARD COPY DATA DIRECTLY FROM MALD TO CSL STOPPED. ALL DATA NOW GOING THROUGH DMO FOR CODING AND TRANSMISSION TO MDB.

CURRENT AND/OR PLANNED ACTIONS

1. TESTING OF COMMUNICATIONS LINK TO ESTABLISH OPTIONAL PROCEDURES.

2. WATER QUALITY DATA AT CSL TO BE RELEASED BY CONTRACTOR (AAI). VALIDATION AND LOADING TO DBMS IS RMA RESPONSIBILITY.

3. CODING OF APPROXIMATELY 700 WATER QUALITY RECORDS.

INSTALLATION RESTORATION
DATA MANAGEMENT OFFICE
ACTIVITIES
"PROCESS TECHNOLOGY SUPPORT"

SIGNIFICANT ACCOMPLISHMENTS TO DATE

STATISTICAL ANALYSIS AND DATA PLOTTING USING "CANNED" TEKTRONIX PROGRAMS, HAS BEEN PERFORMED ON TEST DATA COLLECTED FOR THE 420 AND 10,000 GALLON AND CALGON TEST PROGRAMS.

CURRENT AND/OR PLANNED ACTIONS

1. CONTINUED REVIEW OF MDB INPUT FORMS.

2. DETERMINATION TO BE MADE REGARDING LOADING OF 420, 10,000 AND CALGON TEST DATA IN THE MDB.

3. DEVELOPMENT OF A PROCESS CONTROL PROGRAM FOR WATER TREATMENT SYSTEMS.

INSTALLATION RESTORATION
DATA MANAGEMNT OFFICE
PROBLEM AREAS

A. ADMINISTRATIVE:

1. TEKTRONIX 4081 TERMINAL APPROVAL REJECTED BY DARCOM DUE TO INCONSISTENCIES WITH CSL'S APPENDIX I FOR TOTAL IR SYSTEM NETWORK. RMA'S APPENDIX I WILL BE RE-WRITTEN TO REQUEST INTERIM APPROVAL FOR LEASE OF TEK 4081, NTE TWO (2) YEARS.

2. IMPROVED COORDINATION BETWEEN PMO, RMA, CSL S&E, CSL MIS AND CSL DEMIL/ DISPOSAL OFC IS REQUIRED.

B. OPERATIONAL:

1. LIMITED SUPPORT FROM CSL S&E GROUP.

2. TEKTRONIX TERMINAL PROCESSING LIMITATIONS.

3. MDB FILE STRUCTURE AND OPERATING PARAMETERS.